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ABSTRACT

Designed to help practitioners become more familiar with the underpinnings, currents, pros and cons, and research studies produced by the critical-thinking movement in the United States, this special collection offers eight digests and three FAST (Focused Access to Selected Topics) annotated bibliographies concerning critical thinking at all educational levels. The material in the special collection is designed for use by teachers, students, administrators, researchers, policy makers, and parents. A profile of the ERIC Clearinghouse on Reading and Communication Skills (ERIC/RCS), and information on requesting a computerized search service, searching ERIC in print, submitting material to ERIC/RCS, books available from ERIC/RCS, and an order form are attached. (RS)

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Critical Thinking

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ERIC (an acronym for Educational Resources Information Center) is a national network of 16 clearinghouses, each of which is responsible for building the ERIC database by identifying and abstracting various educational resources, including research reports, curriculum guides, conference papers, journal articles, and government reports. The Clearinghouse on Reading and Communication Skills (ERIC/RCS) collects educational information specifically related to reading, English, journalism, speech, and theater at all levels. ERIC/RCS also covers interdisciplinary areas, such as media studies, reading and writing technology, mass communication, language arts, critical thinking, literature, and many aspects of literacy.

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ERIC/RCS Special Collection 3: Critical Thinking

What Are ERIC/RCS SPECIAL COLLECTIONS?

Each ERIC/RCS Special Collection contains ten or more Digests and FAST Bibs offering a variety of viewpoints on selected topics of interest and importance in contemporary education. ERIC Digests are brief syntheses of the research that has been done on a specific topic. FAST (Focused Access to Selected Topics) Bibs are annotated bibliographies with selected entries from the ERIC database. Both Digests and FAST Bibs provide up-to-date information in an accessible format.

This material cuts across educational levels and can be applied to elementary, secondary, higher education, and special populations. Our *Special Collections* are intended as a resource that can be used quickly and effectively by teachers, students, administrators, researchers, policy makers, and parents.

What Is Critical Thinking?

This *Special Collection* is about *critical thinking*, which has been defined in various ways. Here are a few examples:

- a process that includes an attitude of suspended judgment, incorporates logical inquiry and problem solving, and leads to an evaluative decision or action
- reasonable, reflective thinking that is focused on deciding what to believe or do
- a way of reasoning that combines a demand for adequate support for one's beliefs with an unwillingness to be persuaded unless the support is forthcoming.

No matter how "critical thinking" is defined, teachers at all levels, in classrooms across the United States and around the world, are being called upon to use a critical-thinking approach and to develop critical-thinking skills in their students.

Why Should We Teach Critical Thinking?

Democracies need citizens who can engage in careful, critical thinking with respect to political and economic choices that they must make. Also, thinking clearly and critically is an integral aspect of most jobs in the contemporary workplace. Problem solving, which is important both at home and at work, is an important part of critical thinking.

People are gradually realizing that thinking critically does not just "happen"; it must be encouraged and taught. The classroom environment is the right place to promote the making of informed judgments. The teacher, through modeling, rehearsal, and coaching, may become many students' first and best example of a critical thinker.

Educators are in substantial agreement about the importance of promoting students' ability to analyze, evaluate, and synthesize the information they learn. These are truly "basic skills." Instead of teaching skills in isolation, language-arts teachers are being urged to incorporate both creative and critical thinking into all aspects of literacy education and to develop activities that cultivate students' higher-level cognitive processes and problem-solving skills, including inferencing, evaluation, and decision making.

Unfortunately, many schools fail to provide adequate resources for integrating critical- thinking instruction into the language arts. It may be up to the individual teacher to fill this void. Teachers who accept the need for critical thinking are looking for practical suggestions so that they can modify and supplement their teaching methods to emphasize the development of thinking skills.

This collection of ERIC materials is intended to help you become more familiar with the underpinnings, the currents, the pros and cons, and the research studies produced by the critical-thinking movement in the United States.

We hope you will find it useful.

Recent Journal Articles

The following recent articles, written by people at ERIC/RCS, supplement the Digests and Fast Bibs in this *Special Collection*. They are likely to be available in your local library or through inter-library loan.

"Encouraging Critical Thinking in the Language Arts," *Language Arts*, 67 (7), November 1990, pp. 780-782, by Mary Morgan

"Two Approaches to Critical Thinking," *The Reading Teacher*, 44 (4), December 1990, pp. 350-351, by Carl B. Smith

Other Resources

For those who wish more detailed information on critical thinking, ERIC/RCS offers these books on the topic:

Monographs on "Teaching Critical Thinking" (Jerome Harste, Series Editor):

Critical Thinking: A Semiotic Perspective, by Marjorie Siegel and Robert F. Carey

Critical Thinking and Reading: Empowering Learners to Think and Act, by Allan R. Neilsen

Critical Thinking and Writing: Reclaiming the Essay, by Thomas Newkirk

A Commitment to Critical Thinking, by Carl B. Smith

Critical Thinking, Reading, and Writing, by Mary Morgan and Michael Shermis (A TRIED [Teaching Resources in Education] volume)

More Information from the ERIC Database

A number of citations may be found in the annotated bibliographies included in this collection. Still others may be found by searching the ERIC database. A few of the terms that would be useful in a search are: Critical-Thinking, Problem-Solving, Thinking-Skills, Convergent-Thinking, Divergent-Thinking, and Evaluative-Thinking.

Ellie Macfarlane
Editor, *ERIC/RCS Special Collections*

ERIC Digest

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A New Look at Literature Instruction

by Judith Langer

The teaching of literature is not well understood in American schools. It is often considered a way to indoctrinate students into the cultural knowledge, good taste, and high culture of our society, but its role in the development of the sharp and critical mind is largely ignored. And so, when budgets are cut, literature is high on the list of expendables, and when critical thinking is in, English teachers are asked to do as everyone else, teach critical reading for particular right answers.

In secondary schools there has been no major change in conceptualizing literature instruction in the past 25 years (except for what individual teachers have been doing). While there has been extensive change in English classes, the concern has been primarily with writing. And despite the fact that more than 80% of the writing that goes on in English classes is about literature, there has been little recent research on the teaching of literature. English and language arts teachers have come to feel schizoid in their classes, using process-oriented approaches to writing, and very traditional approaches to the teaching of literature.

No research in literature has attempted to help it keep pace with what we've learned about writing theory—or learning theory. In particular, there has been virtually no study of how students come to understand literature parallel to the study of the writing process.

Across the years, scholars have made distinctions between literary and scientific thought—suggesting that together they form the multiple sources of reason we can draw upon when constructing meaning. For instance, Suzanne Langer speaks of subjective and objective realities, Louise Rosenblatt speaks of aesthetic and efferent readings, and Jerome Bruner speaks of narrative and paradigmatic thought. However, none of these has been systematically studied.

Related works suggests that literary thinking is a natural and necessary part of the well-developed intellect. A series of studies show that doctors, physicians, and lawyers use both modes of thought to solve problems. A recent study at Xerox Parc demonstrated that machine repairers use storytelling to solve their problems.

Yet nonetheless the literary way of thinking has been largely unexplored. We know a lot about scientific, but not about literary (or subjective, or aesthetic understanding). And the teaching of literature has become "rudderless"—without a strong theory of what it's about.

For the past few years, Judith Langer has been developing an underlying theory for the teaching of literature. To do this, she has been studying the nature of literary understanding, and identifying the ways in which the understanding of literature differs from understanding other coursework. She has been using this information as a way to rethink instruction.

Her studies show that during reading, there are a series of relationships the reader takes toward the text—each adding a somewhat different dimension to the reader's growing understanding of the piece.

The four major stances in the process of understanding are:

Being Out and Stepping Into an Envisionment

In this stance, readers attempt to make initial contacts with the genre, content, structure, and language of the text by using prior knowledge, experiences, and surface features of the text to "identify" essential elements in order to begin to construct an envisionment.

Being In and Moving Through an Envisionment

In this stance, readers are immersed in their understandings, using their previously-constructed en-

Judith Langer is Co-Director of the Center for the Learning and Teaching of Literature, SUNY/Albany.

visionments, prior knowledge and the text itself to further their creation of meaning. For the reader, meaning-making moves along with the text. In this stance, for example, the reader may be caught up in a story or may be carried along by the argument of a non-literary work.

Stepping Back and Rethinking What One Knows

In this stance, readers use their envisionments to reflect on their own previous knowledge or understandings. While prior knowledge informs their envisionments in the other stances, in this case readers use their envisionments to rethink what they already know.

Stepping Out and Objectifying the Experience

In this stance, readers distance themselves from their envisionments, reflecting on and reacting to the content, to the text, or to the reading experience itself.

These stances are not linear, can occur and recur at any point in the reading, and help us understand where to provide support in helping students move through the process.

While readers work through these stances in reading both literary and non-literary works, their orientation toward meaning—what they're after—differs substantially. Langer describes readers' orientations toward literary and nonliterary readings in the following ways:

Reaching toward a Horizon of Possibilities

During the reading of literature, the sense of the whole changes and develops as the envisionment unfolds—it exists as a constantly moving *horizon of possibilities*. These possibilities emerge out of the envisionment itself, focusing on the human situation with all its uncertainties and ambiguities—bringing to bear all the reader knows about people, situations, relationships, and feelings. The reading of literature is guided by inquisitiveness, by the opening of possibilities. Readers take each idea they read and try to understand it in terms of their sense of the whole, rather than as a stepping stone along the way. They clarify ideas as they read and relate them to the growing and changing horizon—that horizon modifies the parts and the parts modify the horizon. They do this by searching feelings, intentions, motivations, implications, assumptions, values, and attitudes.

Maintaining a Point of Reference

In non-literary contexts, on the other hand, the sense of a the whole provides a steady *reference point*. As the envisionment unfolds, the new details may clarify the nature of the whole, but they rarely change it. The reader relies on the constancy or sense of the whole in order to monitor initial understandings (or misunderstandings) of the details. Thus, although readers of both literary and non-literary texts continually maintain a sense of the whole, the nature of this whole is somewhat different. Their understanding of literary texts seems to be constrained by their notions of human (or imaginary) possibility, while their understanding of non-literary texts seems to be constrained by their perceptions of the topic.

The reading of literature, then, involves a great deal of critical thought—particularly characterized by the exploration of possibilities. But it is different from the kinds of thinking that students engage in when they read science or social studies pieces, where the pattern is to use the content they read to gain facts.

These notions, both the stances and orientations toward meaning, provide useful guidelines for teachers to use in support of students' processes of "coming to understand."

For further information, see ED 315 755, Langer, Judith (1989), *The Process of Understanding Literature*, Report Series 2.1. May be purchased from Center for the Learning & Teaching of Literature, 1400 Washington Avenue, University at Albany, Albany, NY 12222, price $5.00.

Additional Readings

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ERIC Digest

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Semiotics and the English Language Arts

by Charles Suhor

Semiotics has been condemned as an imperialistic discipline and praised as the most comprehensive of fields. Jonathan Culler, a well-known theorist, acknowledges that "the major problem of semiotics is its ambitions," but he notes that "the value of semiotics is linked to its unwillingness to respect boundaries, . . . to the conviction that everything is a sign." The central concerns of this wide-ranging field can be defined, though, and its implications for teaching can be outlined.

What is Semiotics?

Semiotics is the study of *signs*. A sign is something that stands for something else. There are three kinds of signs:

1. symbols—signs that bear an *arbitrary relationship* to that which they stand for (e.g., the word "apple" by convention stands for the fruit we identify with the word).
2. icons—signs *resembling* that which they stand for (e.g., a painting of an apple looks like the fruit it represents).
3. indexes—signs that are *indicators* of a fact or condition (e.g., a chest pain can indicate heartburn; smoke usually indicates fire).

Additionally, signs can be organized into *systems of objects and behaviors*. The arts and the academic disciplines are highly complex, interrelated sign systems—formulations and configurations of symbols and/or icons. The way you set your table is part of a system of cultural signs, as is your choice of clothes, wallet photos, and bumper stickers. *Ideas* are signs too, since they stand for entities as defined in one's culture. Your idea of snow, for instance, is determined by the repertoire of words, categories, pictures, and other interpretants provided by your culture.

There are three basic areas of semiotics—semantics, pragmatics, and syntactics. *Semantics* deals with the *meanings of signs and sign systems*; that is, meanings of words, sentences, gestures, paintings, mathematical symbols, etc. Stated another way, semantics attempts to specify the cultural definitions of all kinds of signs and sign combinations. *Pragmatics*, broadly speaking, deals with *inferential meaning*—not merely logical inference, but the subtler aspects of communication expressed through indirection ("It's drafty in here" = "Close the door") and through social contexts (as when a threat is understood as horseplay among boasting friends). *Syntactics* deals with the *structure* of signs and sign systems (such as the structure of a sentence, novel, film, fugue, or ceremony). Linguistic syntactics (phonology, morphology, and syntax) is best known by teachers, but semiotics also deals with the "syntax" of nonlinguistic sign systems.

The above definitions, adapted from Umberto Eco, Charles Morris, Charles Sanders Peirce, and others, are necessarily over-simplifications. Yet they provide some sense of the vast range of semiotics, suggesting its relationships to communication, anthropology, psychology, and various traditional school subjects.

Has Semiotics Influenced the Teaching of English and Language Arts?

In oral language, reading, and literature, pragmatics has had a growing influence. Literary theorists, researchers, and classroom teachers find common ground in the notion that reading and writing are not mere message transmission but complex response processes in which the readers and writers cooperate in creating meanings (Beach, 1990; Harste, *et al.*, 1984). The student's back-

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ground knowledge, indeed the student's entire repertoire of life experience, determines the qualities of meaning derived from a text. Similarly, the classroom culture set by the teacher influences not only how well students understand texts, but how they conceptualize the very acts of reading and writing. These are not merely theoretical observations. The teacher who stresses word-calling and five-paragraph themes is sending a different pragmatic message about the nature and purpose of literacy than a teacher who stresses comprehension and process writing.

Reading researchers, moreover, are asking a variety of pragmatic questions about reading: How can our understanding of children's oral language, drawings, and writing be used to enhance emergent literacy? How, and at what ages, do children develop schemata for reading different kinds of stories predictively? How can Peirce's theory of cognition (especially, abductive inference) advance our understanding of reading comprehension?

What Are the General Implications of Semiotics for Teaching?

A comprehensive view of curriculum is implicit in semiotics insofar as *all existing school subjects—and even subjects not yet formulated—are by their nature ways of organizing signs.* If we think of learners as individuals with the potential for understanding and communicating through a variety of signs (such as linguistic, gestural, pictorial, musical, and mathematical signs) and sign systems, we gain a fresh perspective both on human potential and on the organization of school subjects.

A constellation of cognitive, aesthetic, and psychomotor skills is brought to the surface when we consider students' abilities to understand and perform in numerous sign systems. The role of language in the curriculum, moreover, takes on new power in the semiotic perspective. Language is the main arbiter as students learn to use and understand all of the other symbol systems. Language is used by musicians and visual artists in articulating their intentions and describing their techniques. Analysis of the syntax of any nonlinguistic object, from an equation to a piece of sculpture, involves language. So does description of the ideas or emotional responses that the object evokes in us.

The centrality of language in semiotics can be disputed on theoretical grounds, but as Eco (1978, p. 174) says, "Language is the most powerful semiotic device that man has invented." Piaget (1970, pp. 45-46) states that "language is but one among. . .many aspects of the semiotic function, even though it is in most instances the most important." John Carroll acknowledges the educational importance of pictorial forms but notes that they "are almost always accompanied by language and often require language to make them intelligible" (1974, p. 156). Language across the curriculum, then, is not a mere buzzphrase; it is an essential condition for learning.

Semiotics is an overarching conception that provides a stronger basis for interdisciplinary studies than traditional rationales like the humanities and aesthetic education, or more recent ones like global education and visual literacy. (Suhor and Little, 1988) Consistent with Howard Gardner's theory of multiple intelligences (1989), a semiotics-based curriculum would in Dyson's phrase, seek to help children to "develop as symbol users" (1986, p. 800). It would encourage students to talk about the paintings and music they produce, to create collages expressing the themes of novels and plays, to write about the things they see under microscopes, and to engage in a variety of purposeful cross-media activities.

The richness of skills required in a semiotics-based curriculum is evident. Salomon (1970) points to the broad range of mental skills required in multimedia reception and production. Dickson sees in new technologies an immense potential for "juxtaposing symbol systems" in ways that "contribute to the development of metacognitive awareness and higher-order problem-solving skills" (1985, p. 37). The very range of semiotics and its potential for organizing our thinking about curriculum in new ways can add structure and substance to arguments for the things that teachers value: oral language, the written word, the arts, interdisciplinary study, and the articulate exchange of ideas and feelings among students.

Sources for Further Reading

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ERIC Digest

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Schema Activation, Construction, and Application

by Marino C. Alvarez and Victoria J. Risko

Readers rely on their prior knowledge and world experience when trying to comprehend a text. It is this organized knowledge that is accessed during reading that is referred to as schema (plural schemata). Readers make use of their schema when they can relate what they already know about a topic to the facts and ideas appearing in a text. The richer the schema is for a given topic the better a reader will understand the topic.

Schema theorists have advanced our understanding of reading comprehension by describing how prior knowledge can enhance a reader's interaction with the text. Accordingly, comprehension occurs when a reader is able to use prior knowledge and experience to interpret an author's message (Bransford, 1985; Norris & Phillips, 1987). Educators and researchers have suggested numerous instructional strategies to help students activate and use prior knowledge to aid comprehension. Yet, schema theory does not explain how readers modify and create new schema when presented with novel information in texts.

Schema Activation

Because texts are never completely explicit, the reader must rely on preexisting schemata to provide plausible interpretations. Yet, there is much evidence that good and poor readers do not always use schemata appropriately or are unaware of whether the information they are reading is consistent with their existing knowledge. Also, there is evidence that students who do not spontaneously use schemata as they read will engage them if given explicit instructions prior to reading (e.g., Bransford, 1979).

Prereading strategies have been developed to help students relate new information appearing in written discourse to their existing knowledge. The design of many of these preorganizers reflects Ausubel's (1959) definition of readiness and the purpose of their use is to create a mind set prior to reading. These preorganizers have included advance organizers (Ausubel, 1960), structured overviews or graphic organizers (Alvermann, 1981), previews (Graves, *et al.*, 1983), concept maps (Novak & Gowin, 1984), and thematic organizers (Alvarez, 1980, 1983; Alvarez & Risko, 1989; Risko & Alvarez, 1986).

Schema Construction and Application

Learning novel concepts may require the reader to connect new information to a congruent mental model. Mental models represent an individual's construal of existing knowledge and/or new information in the domain even though this information may be fragmentary, inaccurate, or inconsistent (Gentner & Gentner, 1983). A person's mental model is a representation of a particular belief based on existing knowledge of a physical system or a semantic representation depicted in a text. For example, a person may hold a belief that balls are round, inflatable and are made to bounce. However, this person may encounter a football (an ellipsoid) that is kicked or thrown, or ball bearings that are solid, or a bowling ball that is solid and has holes drilled into it for the purpose of rolling rather than bouncing. This new knowledge is integrated into a new, more complex, mental structure about the shape, substance, form, and function of balls.

Marina C. Alvarez is a professor at Tennessee State University; Victoria J. Risko is a professor at Peabody College of Vanderbilt University.

As Bransford (1985) points out, schema activation and schema construction are two different problems. While it is possible to activate existing schemata with a given topic, it does not necessarily follow that a learner can use this activated knowledge to develop new knowledge and skills.Problem solving lessons and activities can provide learners with situations that aid in schema construction which includes critical thinking. Critical thinking theory enables a reader to analyze an ambiguous text. When versed in this process, a reader can either weigh alternative interpretations, dismiss others, make a decision to evaluate multiple possibilities, or accept the information as being reasonable. This process helps students to modify or extend their mental model, or existing knowledge base, for target concepts.

Several teacher-directed and self-initiated activities can be used to promote schema construction and application of knowledge to novel situations. Four such strategies that are designed to foster shared meaning between and among teachers and peers are: cases, interactive videodiscs, hierarchical concept maps, and Vee diagrams.

Cases that present learners with single and varied contexts across disciplines provide learners with scenarios that can be discussed and analyzed from multiple perspectives (e.g., see Christensen, 1987; Spiro, *et al.*, 1987). These cases can include written documents, recorded (musical as well as narrative) interludes, paintings, artifacts, video portrayals, and other pertinent substances and materials. Another teacher-directed strategy is the use of interactive videodiscs. Bransford and his colleagues are developing episodes, revolving around problem-oriented learning environments, that can be computer-accessed by learners to invite critical thinking and schema construction (see Bransford, *et al.*, 1989; Bransford, *et al.*, in press).

Hierarchical concept maps and Vee diagrams are two methods that students can initiate on their own for schema construction and application. Hierarchical concept maps (Novak & Gowin, 1984) are designed to help the reader clarify ambiguities of a text while simultaneously revealing any misconceptions that result from a reading. More importantly they provide the learner with a tool from which to initiate ideas that can be shared by visual inspection with someone else. The Vee diagram (Gowin, 1981/1987) is a method by which a learner can learn about the structure of knowledge and knowledge-making within a given discipline and use this knowledge in novel contexts.

Students can be taught to incorporate new information into their existing world knowledge. This can be accomplished through teacher guided instruction and self-initiated strategies that includes methods and meaningful materials that induce critical thinking with conceptual problems. In order for schema construction to occur, a framework needs to be provided that helps readers to elaborate upon new facts and ideas and to clarify their significance or relevance. Students need to learn more about themselves as learners. Notable in this learning context is the relationship between facts and ideas learned in formal school settings and those encountered in everyday learning environments. Perhaps within this inquiry we will be led to discover the ways individuals choose to relate new information to existing schemata and how this new information influences their future knowledge and decision-making.

Additional material on schemata can be found in the ERIC database. Some recent articles are:

Anstey, Michele. Helping Children Learn How to Learn, *Australian Journal of Reading*, 11 (4) November 1988, p. 269-77. [EJ 383 664]

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How to "Read" Television: Teaching Students to View TV Critically

by Nola Kortner Aiex

In light of the current explosion of mass media products and technology, most education practitioners would probably agree about the urgent need for students to develop critical viewing abilities along with critical thinking abilities.

At the close of UNESCO's 1982 International Symposium on Media Education, the representatives of the 19 countries in attendance issued a unanimous declaration that called upon competent authorities to "initiate and support comprehensive media education programs—from pre-school to university level, and in adult education—the purpose of which is to develop the knowledge, skills, and attitudes which will encourage the growth of critical awareness and, consequently, of greater competence among the users of electronic and print media. Ideally, such programs should include the analysis of media products, the use of media as means of creative expression, and effective use of and participation in available media channels. Training courses should be developed for teachers and intermediaries both to increase their knowledge and understanding of the media and train them in appropriate teaching methods." [Dwyer and Walshe, ED 250 651]

Although there is some evidence that media literacy programs are well underway in classrooms in many countries around the world, such as France, Switzerland, West Germany, England, and the Scandinavian countries [Gambiez, ED 243 408], as well as Australia [Dwyer and Walshe, ED 250 651], curricula in American schools still give little consideration to any systematic study of the ubiquitous mass media.

Media Study in High School

Sneed [ED 307 654] argues that the best time and place for students to begin a serious study of the media is in the high school social sciences curricula. English/Language Arts high school teachers surveyed by Koziol [ED 309 493] also felt that mass media education was better suited to a social studies department. In adolescence, young people become acutely aware of the vast and sometimes confusing array of mass media that permeate their lives.

For example, a recent study on the effects of television tested attitudes of students in grades 6-10 and found that older students were more balanced in their assessments of the influences of the medium, both positive and negative, than were their younger counterparts. These findings suggest that audiences in general, and young people in particular, are far more involved and mentally active when watching TV than has been previously thought. [Krendl and Lasky, ED 287 181] It follows that the public needs to develop skills that can help them better interpret and analyze a variety of video messages. Formal study of the media in high school will also make for better informed citizens. People must become critical viewers, particularly of television—"both the most powerful communication medium ever developed, and the most effective medium for reaching a great number of people simultaneously." [Metallinos, ED 312 675]

Critical Viewing Concepts

Sneed [ED 307 654] believes that the key component to media literacy is understanding the symbols, information, ideas, values, and messages that emanate from the media. O'Reilly and Splaine [ED 289 796] enumerate a number of basic critical view-

ing concepts which apply to all visual media, and especially TV: (1) the direction of the camera will affect how a particular scene is perceived; (2) a director can choose a camera position to impart almost any desired message; (3) even though the event is "live," the director can still "edit" the event by selecting which camera will portray the event; and (4) after an event, the editor can juxtapose a series of images to convey virtually any desired message. In addition, most TV screens are small and provide an ill-defined image, a technical limitation which directly affects the content and methodology of the medium.

Models for Critical Viewing

Specific models for critical viewing of television have also been developed by O'Reilly and Splaine. Viewers should first ask themselves when watching television: what is this program's point of view, what inferences can be drawn from the program, what persuasive techniques are used, and what evidence is used to support the program's argument? After this initial questioning, separate models can be used for viewing news programs, political advertisements or debates, interviews, entertainment programs, sports, or commercials.

For example, the entertainment analysis model, VIPE, asks: V-What values does the program convey? I-Did the program involve the viewer? P-What point is the program making? E-What are the emotional appeals? A similar analysis model for commercials is called MAIL. MAIL asks: M-What was the main point of the commercial? A-What appeals did the advertiser use? I-What images were used to impart the advertiser's message? L-Will the commercial have a long term effect on the viewers? [O'Reilly and Splaine, ED 289 796] O'Reilly and Splaine also caution viewers to remember that commercial TV networks are profit-making businesses, that television thrives on simplicity and avoids complexity in program content, that the omnipresence of television makes most viewers more susceptible to its messages, and that commercial TV programs are generally aimed at the lowest common denominator.

Suggestions for Class Activities

A companion teacher's guide [O'Reilly and Splaine, ED 289 797] to "Critical Viewing: Stimulant to Critical Thinking" offers suggestions for in-class activities as well as longer-term projects and research papers that will interest students at the high school level. Dwyer and Walshe's guide, "Learning to Read the Media" [ED 250 651], developed for elementary school level students in Australia, can be adapted for almost any academic level. This teacher's guide presents over 100 classroom activity units to bring purpose and critical interactions to young persons' encounters with the mass media.

Ploghoft [ED 291 636] provides guidelines and techniques for focusing on TV news programming to help prepare students for their roles as citizens by developing the ability to distinguish between objective and subjective reporting. Among the goals of the suggested activities are for students to be able to (1) distinguish between local, national and international news; (2) analyze the TV news program as to the priorities given to news items; (3) compare and contrast the nightly newscasts of the three networks for the content, selection, and emphasis of the day's news; (4) establish their own criteria for local, state, national, and international news and to analyze the TV news using these criteria; (5) compare the TV news to newspapers and news magazines in terms of content, depth, emphasis, and objectivity; and (6) become aware of the process of news gathering on a local, state, national, and international level.

Implications for the Future

Mass media technology is shaping young people's lives far more than print, and for the traditional public school system to avoid withering, it must take an active role in helping students interpret television imagery. Contrary to some claims, the significance of imagery as an intellectual tool for understanding concepts and processes will not reduce the importance of print in a literacy intensive future environment. Both forms of reading will take on even greater importance, both in the "real" world and the educational world. Print, however, will no longer be considered sacred, and pictures will acquire a newfound respectability. The result will be a more active and rigorous process of teaching and learning. [Adams, ED 260 371]

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Critical Thinking: Promoting It in the Classroom

by M. Carrol Tama

The NCTE Committee on Critical Thinking and the Language Arts defines critical thinking as "a process which stresses an attitude of suspended judgment, incorporates logical inquiry and problem solving, and leads to an evaluative decision or action." In a new monograph copublished by the ERIC Clearinghouse on Reading and Communication Skills, Siegel and Carey (1989) emphasize the roles of signs, reflection, and skepticism in this process.

Ennis (1987) suggests that "critical thinking is reasonable, reflective thinking that is focused on deciding what to believe or do." However defined, critical thinking refers to a way of reasoning that demands adequate support for one's beliefs and an unwillingness to be persuaded unless the support is forthcoming.

Why should we be concerned about critical thinking in our classrooms? Obviously, we want to educate citizens whose decisions and choices will be based on careful, critical thinking. Maintaining the right of free choice itself may depend on the ability to think clearly. Yet, we have been bombarded with a series of national reports which claim that "Johnny can't think" (Mullis, 1983; Gardner, 1983; Action for Excellence, 1983). All of them call for schools to guide students in developing the higher level thinking skills necessary for an informed society.

Skills needed to begin to think about issues and problems do not suddenly appear in our students (Tama, 1986; 1989). Teachers who have attempted to incorporate higher level questioning in their discussions or have administered test items demanding some thought rather than just recall from their students are usually dismayed at the preliminary results. Unless the students have been prepared for the change in expectations, both the students and the teacher are likely to experience frustration.

What is needed to cultivate these skills in the classroom? A number of researchers claim that the classroom must nurture an environment providing modeling, rehearsal, and coaching, for students and teachers alike, to develop a capacity for informed judgments (Brown, 1984; Hayes and Alvermann, 1986).

Teacher Change

Hayes and Alvermann found that coaching teachers led to significant changes in students' discussion, including more critical analysis. The supervision model that was used allowed teachers and researchers to meet for preobservation conferences in order to set the purpose for the observation. Then, each teacher's lessons were videotaped and observers made field notes to supplement the videotape. After the lesson, the researchers met to analyze the tape and notes and to develop strategies for coaching the teachers. In another post-observation meeting, the teachers and supervisors planned future lessons incorporating the changes they felt necessary to promote and improve critical discussion in the classes.

Hayes and Alvermann report that this coaching led teachers to acknowledge students' remarks more frequently and to respond to the students more elaborately. It significantly increased the proportion of text-connected talk students used as support for their ideas and/or as cited sources of their information. In addition, students' talk became more inferential and analytical.

A summary of the literature on the role of "wait time," (the time a teacher allows for a student to respond as well as the time an instructor waits after a student replies) found that it had an impact on students' thinking (Tobin, 1987). In this review of studies, Tobin found that those teachers who allowed a 3-5 second pause between the question and response permitted students to produce cogni-

tively complex discourse. Teachers who consciously managed the duration of pauses after their questioning and provided regular intervals of silence during explanation created an environment where thinking was expected and practiced.

However, Tobin concludes that "wait time" in and of itself does not insure critical thinking. A curriculum which provides students with the opportunity to develop thinking skills must be in place. Interestingly, Tobin found that high achievers consistently were permitted more wait time than were less skilled students, indicating that teachers need to monitor and evaluate their own behavior while using such strategies.

Finally, teachers need to become more tolerant of "conflict," or confrontation, in the classroom. They need to raise issues which create dissonance and refrain from expressing their own bias, letting the students debate and resolve problems. Although content area classroom which encourages critical thinking can promote psychological discomfort in some students as conflicting accounts of information and ideas are argued and debated, such feelings may motivate them to resolve an issue (Festinger, 1957). They need to get a feel for the debate and the conflict it involves. Isn't there ample everyday evidence of this: Donahue, Geraldo Rivera, *USA Today*?

Authors like Frager (1984) and Johnson and Johnson (1979) claim that to really engage in critical thinking, students must encounter the dissonance of conflicting ideas. Dissonance, as discussed by Festinger, 1957 promotes a psychological discomfort which occurs in the presence of an inconsistency and motivates students to resolve the issue.

To help students develop skills in resolving this dissonance, Frager (1984) offers a model for conducting critical thinking classes and provides samples of popular issues that promote it: for example, banning smoking in public places, the bias infused in some sports accounts, and historical incidents written from both American and Russian perspectives.

If teachers feel that their concept of thinking is instructionally useful, if they develop the materials necessary for promoting this thinking, and if they practice the procedures necessary, then the use of critical thinking activities in the classroom will produce positive results.

Matthew Lipman (1988) writes, "The improvement of student thinking—from ordinary thinking to good thinking—depends heavily upon students' ability to identify and cite good reasons for their opinions."

Training students to do critical thinking is not an easy task. Teaching which involves higher level cognitive processes, comprehension, inference, and decision making often proves problematic for students. Such instruction is often associated with delays in the progress of a lesson, with low success and completion rates, and even with direct negotiations by students to alter the demands of work (Doyle, 1985). This negotiation by students is understandable. They have made a career of passive learning. When met by instructional situations in which they may have to use some mental energies, some students resist that intellectual effort. What emerges is what Sizer (1984) calls "conspiracy for the least," an agreement by the teacher and students to do just enough to get by.

Despite the difficulties, many teachers are now promoting critical thinking in the classroom. They are nurturing this change from ordinary thinking to good thinking admirably. They are 1) promoting critical thinking by infusing instruction with opportunities for their students to read widely, to write, and to discuss; 2) frequently using course tasks and assignments to focus on an issue, question, or problem; and 3) promoting metacognitive attention to thinking so that students develop a growing awareness of the relationship of thinking to reading, writing, speaking, and listening. (See Tama, 1989.)

Another new ERIC/RCS and NCTE monograph (Neilsen, 1989) echoes similar advice, urging teachers to allow learners to be actively involved in the learning process, to provide consequential contexts for learning, to arrange a supportive learning environment that respects student opinions while giving enough direction to ensure their relevance to a topic, and to provide ample opportunities for learners to collaborate.

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Thinking Skills in English— And across the Curriculum

by Charles Suhor

Widespread concern about students' poor thinking skills has been expressed recently by educators, journalists, and the public at large. The National Assessment of Educational Progress has reported that students show weaknesses in the logical processes required for clear communication. In *A Nation at Risk*, The National Commission on Excellence in Education noted that students have a poor command of such intellectual skills as drawing inferences and solving problems. The College Board's Project Equality booklet, *Academic Preparation for College*, called for the teaching of reasoning as a basic academic competency, along with reading, writing, speaking, listening, and mathematics. Finally, employers frequently report that young people lack the ability to think through problems and offer alternative solutions.

In spite of acknowledgement of the need to help students develop intellectual skills, little consensus exists about how thinking skills should be taught and who should teach them. Should thinking be taught as a separate skill, as part of each subject area, or as both? Do English and language arts teachers have a special role in the teaching of thinking skills? How do concepts like language and writing across the curriculum relate to thinking skills instruction? These issues will be discussed in this digest.

Thinking Skills Taught in Isolation

Numerous researchers and teachers believe that thinking skills can and should be the focus of special exercises, texts, and programs. Lochhead (1972) speaks of the need "to isolate specific cognitive skills and to design instructional material appropriate for each skill." DeBono, author of the CoRT thinking skills program, claims that "generalizable thinking skills" can and should be taught, in addition to "local skills" required in particular subject matter areas. Howard Citron of Innovative Sciences believes that we must "systematically develop students' thinking and reasoning abilities in a 'purer' sense and directly build . . . transfer of these abilities to academic learning and real behavior." The idea that certain generic thinking abilities underlie school learning is basic to thinking skills programs like Strategic Reasoning, Structure of Intellect, and others (Bossone 1983).

However, there is little agreement among psychologists on what constitutes thinking, and no one has developed a compelling taxonomy of thinking skills for use in educational programs. Different program developers cite Piaget, Bloom, Guilford, Feuerstein, Erikson, and others as credible sources for their work. Each argues persuasively for a particular theoretical approach and makes claims for the feasibility of classroom applications. Researchers' claims for the effectiveness of various approaches are advanced cautiously and disputed vigorously.

Thinking Skills Taught in Each Subject Area

Ideally, training in thinking processes would be woven into subject area study. Two decades ago, much attention was given to Bruner's idea that the concepts central to each discipline can be taught through the discovery method (1960). In recent years, specialists in mathematics, visual arts, music, and other subjects have claimed that unique aspects of their disciplines involve distinctive mental skills, requiring specially tailored strategies for learning.

While some subject-specific thinking skills undoubtedly exist, it is also clear that numerous cognitive skills cut across several school subjects. In both history and literature, students must be able to infer

motivation, understand sequences,and trace cause/effect relationships. Skill in estimation, measurement, and visual imagery is essential to woodworking and geometry alike. All subjects involve definitions that in turn include classification and specification, comparison and contrast. No discipline can claim exemption from many of the mental processes that the advocates of isolated instruction in thinking skills see as generic.

Thinking Skills in the English Language Arts

The English language arts, pre-K through college, inherently involve a wide range of essential thinking skills because of the close relationships between thinking and language as established by Piaget, Vygotsky, Luria, and others. Additionally, many aspects of reading and writing are pertinent to important thinking skills, as evidenced by the 1981 National Assessment of Educational Progress Report on *Reading, Thinking, and Writing*. Student writing samples were found to lack the cognitive superstructures that inform clear writing, such as, organization of ideas, continuity, and cohesion.

Numerous theorists, researchers, and practitioners have linked generic thinking skills with subject matter traditionally associated with English and language arts instruction. Moffett and Wagner's (1983) K-13 program is perhaps the most expansive of the cognitive-based language arts curricula. Hays and others (1983) have explored writing as a mode of thinking. Relationships between class discussion and thinking have been articulated by Stanford and Roark (1974) and Staton (1984). Pearson and Tierney (1984) are among those who see reading as an active mental process involving the construction of meaning. The NCTE "Essentials of English" statement holds that teaching of creative, logical, and critical thinking is close to the core of effective English instruction.

English teachers have a special role in the teaching of thinking skills, precisely because of what Boyer(1983) calls "the centrality of language" in the curriculum. But of course, this role does not imply that language and thinking are the exclusive domain of English teachers. A broader conceptualization is needed—one that places language in perspective with both the subject-specific and the generic thinking skills involved in other disciplines.

Language and Thinking across the Curriculum

The pervasiveness of language in the teaching of all subjects and the close ties of oral and written language to thinking suggest that language across the curriculum is a primary concept in developing all thinking skills. Carroll (1974) stated that "the various forms of pictorial expression are almost always accompanied by language and often require language to make them intelligible." Piaget (1971) has written that "language is but one among . . . many aspects of the semiotic function, even though it is in most instances the most important." Eco (1972) agrees that language is "the most powerful semiotic device that man has invented." Certainly language is used by musicians and visual artists in articulating their intentions and describing their techniques. And critical analysis of the elements in any nonlinguistic work involves language, as does description of the responses that the work invokes in us. Even highly abstract visualization processes in mathematics and intuitive psychomotor activities in athletics are, to some extent, mediated by language in school settings.

The student who is articulate in oral and written language has an indispensable tool for all school learning, because the ability to give shape to thought through language is a necessary (though not of course sufficient) skill in every subject. Language, thinking, and learning are inseparable, according to Thaiss (1984). "If we do not apply the full range of language resources to our learning of any subject, then we stifle thought, conscious and unconscious, and so deprive ourselves of more than the most superficial understanding."

Thaiss does not call for teachers of other subjects to assume the English teacher's responsibility for teaching sentence structure, standard English usage, or compositional form and style. Rather, language across the curriculum means *verbalization as the fulfillment of understanding within each subject area*. A close look at good writing across the curriculum materials (for example, *LiveWire* or Tchudi and others, 1983) supports this notion. The writing assignments call for exercise of students' generic thinking processes and those pertinent to the subject area. Oral and written "prewriting" activities serve as mental organizers, leading towards a coherent writing product that demonstrates deep understanding of the subject.

Finally, simple introspection provides a common-sense verification of the idea that skill in language is closely related to significant learning. In dealing with new and difficult content, from intricacies of grammar to computer programming, each of us tends to go through an initial "grasping" in which we understand key concepts but cannot converse fluently, much less write cogently, about them. As our exposure to the material increases, we are able to shape our comprehension through questions, tentative verbalizations, informal talks with others,

reorganization of notes, and so forth. Through language, then, we gradually mold nascent insights into more cohesive forms. We not only recognize the structure of the subject (as one does in merely taking an objective test) but also verbally manipulate its ideas, *expressing* its orderliness in personalized and unique ways.

Language as a way of thinking and learning, then, is not merely a pedagogical catchphrase. It is an essential element in every classroom and the most persuasive way of insuring that thinking skills are, in fact, being taught effectively in every subject area.

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Metacomprehension

by Sally N. Standiford

Teachers make many instructional decisions based on their assessments of student comprehension. "Excellent" students, for example, are often given enrichment materials, so they will not be bored while the teacher works with other students; "poor" students, on the other hand, are often given remedial materials to help them "catch up." Almost always, such decisions are based on what a student knows or does not know relative to the teacher's questions. Assessment of a student's comprehension, although necessary and important, is not always sufficient. Teachers might consider another dimension: the student's metacomprehension, or awareness of his or her own understanding.

What is Metacomprehension?

Who of us has not had the experience of reading a book and becoming aware that we have not understood the content of the last few pages? At the point of that awareness, our metacomprehension was very high—we knew we had not processed anything just read. On the other hand, while we were reading absentmindedly, our metacomprehension was very low—we were unaware of our own level of understanding. Metacomprehension, then, is the awareness of and conscious control over one's own understanding or lack of it.

Regardless of whether or not students are "doing well" (by whatever grading scheme we use), they may or may not be aware of their own degree of understanding. Students with high metacomprehension are either those who know they understand when, in fact, they do, or those who know they do not understand when, in fact, they do not. Their awareness of their understanding accurately reflects their comprehension.

Students have inaccurate or low metacomprehension if they are uncertain or if they are unaware that they do or do not understand. Poor metacomprehension may be exhibited in different ways: there are students who are sure they just "blew" tests on which they subsequently get top scores, students who believe that they have the material "down pat" and perform poorly, and students who just have not thought about their own state of understanding.

By combining comprehension-metacomprehension dimensions, we can divide students into the following four groups:

- High Comprehension-High Metacomprehension (students who know and are aware that they know)
- Low Comprehension-High Metacomprehension (students who do not know and realize they do not know)
- High Comprehension-Low Metacomprehension (students who know but think they do not know)
- Low Comprehension-Low Metacomprehension (students who do not know but think they do know)

Why is Metacomprehension Important?

One of the primary goals of instruction is to help students become efficient and effective learners—to have them become responsible for their own learning. Effective learning requires awareness of one's understanding or lack of it, as well as knowing what to do when one fails to understand.

Baker and Brown (1980) have identified three main reasons for comprehension failures:

- the learner does not have enough information about the topic to interpret the message (written or oral)
- the learner has the appropriate schemata, or prior knowledge, but there aren't enough clues in the message to suggest them to the learner

- the learner interprets the message consistently, but the interpretation is different from the one intended by the author or speaker

It is very unlikely that students in the third group will take remedial action, because they will not realize that their comprehension has failed. Students who fail to construct consistent interpretations are more likely to attempt activities to clarify their understanding. "Such self-awareness is a prerequisite for self-regulation, the ability to orchestrate, monitor, and check one's own cognitive activities," according to Brown, Campione, and Day (1980).

What Can English/Language Arts Teachers Do?

Asserting that sophisticated reading is a complex, acquired skill, Stewart and Tei (1983) state that readers need to learn how to engage in certain activities to achieve the goals of reading. One such goal, for example, is reading to study. This may involve skills such as recognizing and retaining main points, rereading important sections, making adjustments in reading rate, and self-testing to monitor the success of various strategic activities. Awareness of the understanding and use of these skills is necessary to metacomprehension.

Schallert and Kleiman (1979) have identified some strategies reading teachers can use to help students' metacomprehension:

- Focusing the student's attention on the main ideas
- Asking students questions about their understanding to help them monitor their comprehension
- Relating the student's relevant prior knowledge to the new information

As teachers we need to teach students how to use such activities and encourage their independent use.

For students with low comprehension-high metacomprehension, teacher questions and feedback designed to help students apply appropriate studying strategies and techniques can be effective. These students do not gain from those teacher responses that simply indicate that they are wrong—they already know that. As teachers better understand these strategies and techniques, they can train students to use them more effectively. For example, instructing students to summarize a reading without giving them any criteria for development of a summary does a disservice to those students who are aware that they do not know how to construct such summary.

Students with high comprehension-low metacomprehension need consistent, positive verbal and written reinforcement. Although some research has demonstrated that the positive reinforcement of confirming correctness for some students is ineffective, regular positive reinforcement is effective for this subset of students, since their lack of confidence is critical.

The approach for students with low comprehension-low metacomprehension should be to focus on the metacomprehension dimension first, breaking through their false sense of understanding rather than teaching them content. One might ask these students questions that help them recognize a contradiction between what they really know and what they think they know, but don't. For example, a student who draws an illogical inference from a reading passage due to incomplete background knowledge may be unconvinced if simply told that he or she is wrong. Such a student could be confronted with his or her misunderstanding by being shown similarities and/or differences between the passage in question and analogous material more familiar to the student.

How Can Teachers Evaluate Student Metacomprehension?

One of the simplest ways to assess a student's awareness of understanding is to ask the student to rate the certainty that he or she has answered correctly or incorrectly. Students with good metacomprehension will respond that they are relatively certain that their correct answers are correct or that their incorrect answers are incorrect. Poor metacomprehenders will have a mismatch between their answers and their confidence ratings. A word of caution: younger students frequently respond positively when questioned on how sure they are of what they know, regardless of the truth of their assertions (Baker and Brown 1980). More direct evidence of metacomprehension for these students might come from monitoring the self-correction of their errors during such learning activities as reading.

"The ability to reflect on one's own activities ... is a late developing skill with important implications.... If ... the child is not aware of his own limitations as a learner or the complexity of the task at hand, then he can hardly be expected to take preventive actions in order to anticipate or recover from problems" (Baker and Brown 1980).

It is not enough for a teacher to be aware of the dimension of comprehension awareness. Development of the student's own awareness is crucial. To better serve their students, English language arts

teachers should regularly and actively integrate metacomprehension strategies in their classrooms.

Sources for Further Reading

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Critical Thinking in College English Studies

by Donald Lazere

The Critical Thinking Movement

A key event in the phenomenal growth of the critical thinking movement in American higher education was Chancellor Glenn Dumke's Executive Order 338 (1980) announcing the requirement of formal instruction in critical thinking throughout the nineteen California State University campuses, serving some 300,000 students. Similar requirements quickly followed in California community colleges and high schools.

The pertinent section of Executive Order 338 reads as follows:

"Instruction in critical thinking is to be designed to achieve an understanding of the relationship of language to logic, which should lead to the ability to analyze, criticize, and advocate ideas, to reason inductively and deductively, and to reach factual or judgmental conclusions based on sound inferences drawn from unambiguous statements of knowledge or belief. The minimal competence to be expected at the successful conclusion of instruction in critical thinking should be the ability to distinguish fact from judgment, belief from knowledge, and skills in elementary inductive and deductive processes, including an understanding of the formal and informal fallacies of language and thought."

In California and elsewhere, college-level critical thinking instruction has largely been assumed to be the realm of philosophy departments. Within the discipline of philosophy, however, the critical thinking movement has turned from an emphasis on formal logic and linguistic analysis, and toward informal logic, or the application of principles of reasoning to everyday situations. The movement has also seen a growing attention to the mental attitudes and emotional "dispositions" that foster or impede critical thinking within the broader context of psychological, cultural, social, and political influences. This changing emphasis within philosophy has promoted interdisciplinary coordination of critical thinking studies with English and rhetoric along with many other fields—preeminently developmental psychology.

The stage-developmental schemas of psychologists like Piaget, Kohlberg, Gilligan, Perry, and Bloom have suggested supplementary criteria of critical thinking. (Applications of such criteria have been somewhat speculative and disputable to date, to be sure, as are stage-developmental theories in general.) These criteria include the ability to reason back and forth between the concrete and the abstract, the personal and the impersonal, the literal and the hypothetical or figurative; facility in perceiving irony, ambiguity, and multiplicity of meanings or points of view; and the development of open-mindedness, reciprocity (Piaget's term for ability to empathize with other individuals, social groups, ideologies, etc.); and autonomous thought.

Critical Thinking in Composition Studies

The incorporation of developmental psychology into critical thinking studies converges with its recent incorporation into composition research and instruction. Several reports of the National Assessment of Educational Progress have indicated that student writers' main weakness occurs in the progression from narrative and descriptive modes to modes directly requiring critical thinking—analysis, synthesis, argumentation, and evaluation of sources and ideas. Researchers in collegiate basic writing have addressed problems impeding this progression and have explored pedagogical strategies for overcoming them.

Shaughnessy's seminal *Errors and Expectations* not only pinpointed some of these cognitive impediments but also identified elements that can be considered prerequisites to critical thinking. These

include the ability to concentrate, to retain material studies, to sustain an extended line of reasoning in reading or writing, and to reason back and forth among the past, present, and future. Shaughnessy further delineated students' difficulties with "the vocabulary of general literacy" (1977, 216-221), her term for the codes of academic discourse which encompass the language both of critical thinking and of what Hirsch has called "cultural literacy." Lunsford (1980), in "The Content of Basic Writers' Essays," explicitly applied Piaget and Kohlberg to the designing and evaluation of writing assignments fostering development from egocentric to reciprocal and from conventional to autonomous moral reasoning.

Composition textbooks and courses can best incorporate critical thinking—and in some cases have done so—not only in units on logic and persuasion, but in those in diction and semantics, tone, audience, and writing from sources. Several recent textbooks are expressly devoted to logic in writing, while a growing number of others combine this approach with critical reading. There is some indication that rhetorics and anthologies are moving away from a structure based on modes of exposition toward a developmental sequence of modes of reasoning designed to build critical thinking skills. Sternglass (1983) and Kytle (1986) have written textbooks and Olson (1984) and Lazere (1986) have published course descriptions structured in this way.

Kytle's *Clear Thinking for Composition*, first published nearly twenty years ago, anticipated the current emphasis on attitudes or dispositions in critical thinking instruction. Its chapter "Blocks to Logical Thinking" considers culturally conditioned assumptions, prejudice, ethnocentrism, primary certitude (absolutism), authoritarianism, and unconcretized abstractions. Other forerunners emphasizing psychological dispositions include Altick, whose *Preface to Critical Reading* first appeared in 1946, and Hayakawa, whose Language in Thought and Action was first published in 1941. Hayakawa's general semantics approach has been perpetuated by the journal ET CETERA, especially under Neil Postman's editorship, and the NCTE Committee on Public Doublespeak.

A political approach to critical thinking in composition courses is provided in teachers' guides by Shor (1980) and Lazere (1986). This approach generates writing assignments out of Frankfurt School critical theory, emphasizing critical consciousness toward mass culture, and out of Paulo Freire's notion of liberatory literacy.

Critical Thinking in Literary Studies

A strong case can be made that literature—properly reunified with rhetoric and composition—is the single academic discipline that can come closest to encompassing the full range of mental traits currently considered to comprise critical thinking. The mental dispositions increasingly emphasized within critical thinking circles have a familiar ring to teachers of literature and literary criticism—the capacities: to unify and make connections in one's experience; to follow an extended line of thought through propositional, thematic, or symbolic development; to engage in mature moral reasoning and to form judgments of quality and taste; to be attuned to skepticism and irony; and to be perceptive of ambiguity, relativity of viewpoint, and multiple dimensions of form and meaning (literal and figurative language, syntactic and structural complexity, etc.).

Paul (cited in Walsh and Paul, 1985, 11-12) asserts that "a setting that facilitates the exchange of free dialogue between opposing views is essential to any authentic exercise of critical thinking. The tradition of humanistic and creative literature is preeminently a tradition of dialogue from Socrates and Greek tragedy to Albert Camus's "civilization of dialogue." Every great work of literature engages the reader in critical dialogue with its author, language, and characters, and in the dynamic interaction that Emerson characterized as *Man Thinking*.

Moreover, a growing body of research in both English and psychology strongly indicates that neither critical thinking nor cognitive development can effectively advance except in dialectical interaction with a substantial body of domain-specific knowledge (see McPeck, 1981; Hirsch, 1987). Clearly, that particular body of knowledge contained in literature, in its broad sense of humanistic "letters," is eminently congenial in its subject matter and in the qualities of mind it reflects, to the essential traits of critical thinking. Nearly every other discipline has come forth to claim that it too has been fostering critical thinking all along, but in none of these is the very concept of "criticism" central as it is in literature.

No more powerful case could present itself to persuade the public of the value of reemphasizing the study of literature at all levels. Ironically, however, although many courses, textbooks, and research projects have emerged in composition for critical thinking, there are very few to date in literature. (Scholars, including Kohlberg, 1981; Gilligan, 1982; Meyers, 1986; and Bergstrom, 1983, have applied principles of cognitive development to the study of literary works.) What is called for is perhaps no more than a minimal rethinking of the discipline

to bring the tacit component of critical thinking in literary study to the surface. The explicit effort to make critical thinking the primary reason for being of literary scholarship might well provide the rejuvenating force the profession has long been missing.

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Creativity

by Gail Londergan

This bibliography brings together recent research and literature reviews from the ERIC database on the topic of creativity. Citations which give overviews of recent research and theory are presented first. These are followed by references to work in the two areas which many creativity scholars now consider the most promising lines of inquiry. The first of these is that of "problem finding" (as opposed to "problem solving"); the second is the area of social influences on creativity, focusing in particular on the critical importance of intrinsic motivation to the creative effort. References to other works on the impact of family and of school on creative individuals and their behavior then are listed. Citations on adult creativity and creative growth across the lifespan follow next. References to two works which touch on private aspects of the creative experience close that section and complete the bibliography.

Overviews

Gardner, Howard. "Creativity: An Interdisciplinary Perspective," *Creativity Research Journal*, v1 p8-26 Dec 1988.

Several research disciplines have contributed to an emerging picture of creative individuals, processes, and achievements. Contributions to a science of creativity are reviewed, focusing on the psychometric approach, cognitive approaches, studies of personality and motivation, sociological and historiometric investigations, and neurobiological aspects of unusual human performance.

Torrance, E. Paul. "Some Products of Twenty Five Years of Creativity Research," *Educational Perspectives*, v22 n3 p3-8 Fall 1984.

Describes what the author regards as 25 of the most significant outcomes of 25 years of creativity research. Some were selected for the influence they have had on educational practices; others were selected for their potential in making a difference in future educational practice.

Woodman, Richard W.; Schoenfeldt, Lyle F. "An Interactionist Model of Creative Behavior," *Journal of Creative Behavior*, v24 n1 p10-20 1990.

Proposes an interactionist model of creative behavior which combines elements of the personality, cognitive, and social psychology perspectives on creativity. The model considers the interplay of factors including antecedent conditions, creative behavior, consequences, the individual, cognitive style/ability, personality traits, contextual influences, and social influences.

Hayes, John R. "Cognitive Processes in Creativity." Occasional Paper No. 18. Center for the Study of Writing, Berkeley, CA.; Center for the Study of Writing, Pittsburgh, PA. Also appears in Glover, J. A., ed., and others. *Handbook of Creativity, Assessment, Research, and Theory*. New York, Plenum Publishing Corporation, 1989. [ED 317 947]

What are creative people like? Four personality traits appear to differentiate more creative from less creative people: devotion to work, independence, drive for originality, and flexibility. Creative people do not have higher IQs or get better school grades than others—in fact, no cognitive abilities have been identified which reliably distinguish between creative and non-creative people. All of the variables which discriminate between creative and non-creative people are motivational. Over a period of time, these differences in motivation cause cognitive differences (such as the acquisition of extensive knowledge) which contribute in critical ways to creative performance. These motivational and cognitive differences jointly account for the observed differences between creative and non-creative individuals, but the origin is in motivation, not in cognition.

Problem Finding

Getzels, J. W. "Problem Finding and the Enhancement of Creativity," *NASSP Bulletin*, v69 n482 p55-61 Sep 1985.

Describes a 20-year study of 31 artists as students and as professionals that reveals that

skills in finding and formulating problems are significantly related to creative achievement. Accordingly, educators should turn their attention to teaching such skills.

Moore, Michael T. "The Relationship between the Originality of Essays and Variables in the Problem-Discovery Process: A Study of Creative and Non-creative Middle School Students," *Research in the Teaching of English*, v19 n1 p84-95 Feb 1985.

Reports on a study conducted to determine whether there is a relationship between problem discovery and the assessed originality of the written product, and whether problem-solving behavior is observable in student writers. Results did indicate a relationship between problem finding and the originality of the product.

Runco, Mark A.; Okuda, Shawn M. "Problem Discovery, Divergent Thinking, and the Creative Process," *Journal of Youth and Adolescence*, v17 n3 p211-20 Jun 1988.

The role of problem solving in divergent thinking and creative performance of 19 male and 10 female adolescents was studied. The subjects generated significantly more responses to discovered problems than to presented problems. The unique variance of discovered problems was related to five indices of creative performance.

Subotnik, Rena F. "Factors from the Structure of Intellect Model Associated with Gifted Adolescents' Problem Finding in Science: Research with Westinghouse Science Talent Search Winners," *Journal of Creative Behavior*, v22 n1 p42-54 Jan-Apr 1988.

A study of 147 Westinghouse Science Talent Search winners classified 57 subjects as independent problem finders. They were asked to select five of the 31 factors in Guilford's Structure of Intellect model which best described the process of choosing their research question. Discusses implications for educating secondary science students.

Social Influences

Amabile, Teresa M. "Social Influences on Creativity: Interactive Effects of Reward and Choice." Paper presented at the Annual Convention of the American Psychological Association, 1985. 17p. [ED 265 705]

In a test of the intrinsic motivation hypothesis of creativity, 60 undergraduate women did an artistic creativity task with either the expectation of receiving a reward or no expectation of reward. The lowest creativity was exhibited by subjects who had contracted to receive the reward. Results suggest that creativity can be undermined by reward that is contingent upon task engagement.

Amabile, Teresa M. and others. "Immunizing Children against the Negative Effects of Reward." Paper presented at the Biennial Meeting of the Society for Research in Child Development, 1987. 22p. [ED 285 655]

To determine whether training could counter deleterious effects of reward on motivation and creativity, 68 students in grades 3, 4, and 5 were assigned to one of four conditions in which intrinsic motivation training and rewards were either provided or withheld. The reward contingency produced the predicted decrement in creativity for control group subjects. In contrast, rewarded students who received intrinsic motivation training were judged significantly more creative than those receiving training and no reward.

At Home, At School

Singh, R. P. "Parental Perception about Creative Children," *Creative Child and Adult Quarterly*, v12 n1 p39-42 Spr 1987.

The "Torrance Ideal Child Checklist" was administered to 260 mothers and fathers, and the results were correlated with the judgments of 10 experts on creative personality. Concludes that parents did not perceive the personality characteristics of creative children favorably or in the same way as the experts did.

Olszewski, Paula and others. "The Influence of the Family Environment on the Development of Talent: A Literature Review," *Journal for the Education of the Gifted*, v11 n1 p6-28 Fall 1987.

A literature review on families of gifted and talented individuals sought to determine the importance of several broad areas on talent development (structural or demographic characteristics, family climate or environment, values espoused and/or enacted by parents). Family climate variables differed between individuals exhibiting creative versus academic achievement.

Hennessey, Beth A.; Amabile, Teresa M. "Creativity and Learning: What Research Says to the Teacher." National Education Association, Washington, D.C., 1987. 34p. [ED 312 835]

Reviews research on creativity and applies it to the learning process. After discussing the definition and measurement of creativity, the com-

ponents of creative performance are outlined, including domain-relevant skills, creativity-relevant skills, and intrinsic task motivation. Strategies for nurturing intrinsic motivation and creativity in classrooms are explored.

Cohen, Leonora M. "Developing Children's Creativity, Thinking, and Interests. Strategies for the District, School, and Classroom." Oregon School Study Council, Eugene, 1988. 71p. [ED 296 449]

To foster individual development, educators must seek the gifts in every child, in those not demonstrating academic abilities as well as in the most brilliant. Currently, a big discrepancy exists between the child's potential and what schools actually value or stimulate. To produce Renaissance or visionary men and women will require a reexamination of play, interest development, self-regulation, and autonomy in early creative development.

A Lifetime of Creativity

Johnson, Scott H. "A Cognitive-Structural Approach to Adult Creativity." Paper presented at the Annual Symposium of the Jean Piaget Society, 1987. 17p. [ED 285 972]

Suggests a framework for the study of adult creativeness from a cognitive-structural orientation, reconciling traditional developmental theory with a nontraditional approach to the definition and study of inventiveness. Reports on a study undertaken to investigate the possibility that the problem-finding stage of cognitive development is inseparable from creativity. Data are shown that imply that problem finding is a critical component in the creative process.

Richards, Ruth L. and others. "Assessing Creativity at Work and Leisure: The Lifetime Creativity Scales." Paper presented at the Annual Convention of the American Psychological Association, 1985. [ED 274 891]

Describes a new research instrument, The Lifetime Creativity Scales (LCS), as providing broad-based assessment of innovative activity at work and leisure, without the requirement that activities be socially recognized or limited to particular fields of endeavor, allowing for study of real-life creativity in general populations. The scales show high interrater reliability and multiple indications of construct validity. Findings are presented which raise interesting questions involving the relationship between vocational and avocational creativity, and equality of vocational opportunity for men and women.

Dacey, John S. "Peak Periods of Creative Growth across the Lifespan," *Journal of Creative Behavior*, v23 n4 p224-47 1989.

Reviews the literature on two questions: What is the normal course of creative development? and Do peak periods exist during which people are most open to efforts to foster creative abilities? Six specific periods are identified as peak periods of creative growth.

Dohr, Joy H.; Forbess, Linda A. "Creativity, Arts, and Profiles of Aging: A Reexamination," *Educational Gerontology*, v12 n2 p123-38 1986.

Presents findings from a study exploring creative activity and motivational interest of 75 rural older adults on a creative arts community program, home environment, and non-arts community senior programs. Results indicate that older adults do not necessarily perceive a decline in creative capacity with age.

Shaughnessy, Michael F. "Toward a Creative Female's Life Cycle," *Creative Child and Adult Quarterly*, v12 n2 p84-92 Sum 1987.

Cites the work of prominent life cycle theorists and gives brief summaries of the lives of several famous women and their accomplishments. With emphasis on particular attributes common to the creative, gifted, and talented female, a tentative life cycle model is formulated.

Pickard, Eileen. "Toward a Theory of Creative Potential," *Journal of Creative Behavior*, v24 n1 p1-9 1990.

Outlines cognitive processes underpinning creative ability, considers their development, and discusses the creative potential of the individual at various life stages. Creativity is viewed as an outcome of self-directed transformational activity. Fantasy and imagination are discussed, as are public versus private creativity.

Bruch, Catherine B. "Metacreativity: Awareness of Thoughts and Feelings during Creative Experiences," *Journal of Creative Behavior*," v22 n2 p112-22 1988.

Metacreativity is described as the study of internal observations of creative processing. The concept is defined in relation to metacognition, related research is reviewed, and models which point to relevant cognitive, affective, and physical/sensory qualities are discussed.

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Critical Reading and Thinking: Instructional Strategies

by Michael Shermis

Helping students develop higher-level and analytical skills, such as critical reading and thinking, can be a challenging undertaking. This *FAST Bib* provides a number of resources to help with that endeavor. A search of the ERIC database produced the following references from the period 1985 to 1989. The citations include instructional strategies for teaching visual literacy, religion, spelling, reading, semiotics, problem solving, literature and composition, metaphorical thinking, and home economics. Some focus on particular groups, such as adolescents or at-risk students.

Activities to Promote Critical Thinking. Classroom Practices in Teaching English, 1986. National Council of Teachers of English, Urbana, IL, 1986. 158p. [ED 273 985]

Outlines ways to teach literature and composition that engage the students in such thinking processes as inferring, sequencing, predicting, classifying, problem solving, and synthesizing. The activities are divided into categories for composition, speaking and listening, literature study, additional creative and critical thinking activities, and speaking and writing across the curriculum.

Barwick, Joseph T. "Literature and Student Cognition." Paper presented at the 3rd Annual City Colleges of Chicago Literature Conference, 1988. 17p. [CS 211 594]

Asserts that an important task for literature teachers is to develop students' capacity for abstract thinking so that it can be employed on problems at will and by choice. The first process of abstract thinking is one which enables a person to see a connection between A and B, including processes of cause/effect, making analogies, or making comparisons. Another type of abstract thinking is that which enables a person to see a relationship between A and B that yields C, which uses inductive and deductive reasoning, and produces inferences and conclusions. The third and final type of abstract thinking is the process that enables a person to understand A so that what is learned can be applied elsewhere, enabling a person to generalize. The study of literature is particularly well-suited to teach this cognitive skill, because the purpose of literature is to transcend the narrow boundaries of the story and find some essential meaning for all of humanity. Teachers need to break down the concept of cognition into its component parts, in order to develop more effective strategies for teaching abstract thinking.

Borchardt, Donald A. "Confronting the Concrete and the Abstract in Critical Thinking." Paper presented at the Annual Meeting of the International Society for Exploring Teaching Alternatives, 1988. 12p. [CS 506 481]

States that the principles of synergy, the process by which one need or person combines optimally with another, can be applied to critical thinking in television broadcasting. Analysis of what one sees and hears on television, through questioning the abstract and concrete aspects of information, establishes a way to make the media problematic to students.

Carpenter, Donna. "The Original 'Fatal Attraction': Metaphorical Thinking and 'Medea,'" *English Journal*, v77 n8 p42-44 Dec 1988.

Stresses that metaphorical thinking encourages students to see relationships and requires them to use higher level critical thinking, particularly analysis and synthesis. Describes strategies to help students to think metaphorically in order to understand the elements of Greek tragedy.

Cianciolo, Patricia J. *Critical Thinking in the Study of Children's Literature in the Elementary Grades*, Elementary Subjects Center Series No. 5. Institute for Research on Teaching. Michigan State University, East Lansing, MI, 1988. 66p. [CS 211 653]

Explores some alternative ways to think about critical thinking in the study of literature in the

elementary grades. Addresses the following topics: (1) the major factors influencing the trends in the literature curriculum in the elementary grades within the past 30 years; (2) substantive research focusing on critical thinking about children's literature, selection of materials for use in the teaching of critical thinking about literature, especially critical thinking about literature as art; and (3) literature programs originating from various sources, i.e., children's literature textbooks developed in colleges, or by state departments of education, and commercial children's literature programs. Argues that when literature is viewed as an art, students can study literature in its truest sense—that is, engage in critical thinking when interpreting and evaluating it.

Commeyras, Michelle. *Analyzing a Critical-Thinking Reading Lesson.* Technical Report No. 464. Bolt, Beranek and Newman, Inc., Cambridge, MA; Center for the Study of Reading, University of Illinois, Urbana, IL, 1989. 23p. [CS 009 580]

Analyzes the transcript of a critical-thinking reading lesson for sixth grade students to examine the interdependent relationship between critical thinking and reading comprehension, and to show critical thinking can be infused into classroom instruction using ordinary classroom materials (e.g. selections from a basal reading series).

Dilworth, Collett B. "Critical Thinking and the Experience of Literature." Paper presented at the 75th Annual Meeting of the National Council of Teachers of English, 1985. 13p. [ED 266 477]

Asserts that, despite the current emphasis on thinking skills and the resulting concentration on lists and taxonomies that do not succeed beyond research contexts, critical thought relies not on applying mental steps but on simply trying to figure out what might be right or wrong. This depends on one basic cognitive act, contrasting—directing one's initial thoughts to the crucial differences between things or to the distinctions that reveal essential characteristics. This thinking is necessary and natural in the study of literature because writers often use comparison and contrast in their writing, while readers must compare and contrast their understanding against the criterion of the text's assumed coherence. To help students enjoy literature's resonances (the relationships of such elements as images, characters, and circumstances), teachers must foster their critical perceptions and contrastive powers through recognizing and applying contrastive thought. Such critical thought can be taught by example, guided discussion, and independent writing, particularly through use of a divided reader's journal in which students paraphrase and quote contrastive parts of literature texts.

Goldstone, Bettep. "Visual Interpretation of Children's Books," *Reading Teacher,* v42 n8 p592-95 Apr 1989.

Examines how visual literacy (the ability to interpret the visual images of advertisements, illustrations, television, and other visual media) can promote creative and analytic thinking. Provides several instructional strategies to teach visual literacy through book illustrations. Notes that visual literacy is essential in a world increasingly dominated by visual messages.

Hepburn, Velma. "A Professor's Formula for Teaching Critical Thinking." 1989. 7p. [CS 009 539]

Presents a formula for writing critical thinking assignments on different academic levels which professors can use in training elementary and secondary educators and in developing critical thinkers. Includes lists of terminology, instructional materials, and assignments (at various academic levels) which may be combined into a variety of assignments.

"Higher Order Thinking Skills: A Catalog of Products, Publications, and Services." Southeastern Educational Improvement Lab., Research Triangle Park, NC, 1989. 10p.
[CS 009 524]

Lists and describes 31 products, publications, and services available from the nine regional educational laboratories funded by the Office of Educational Research and Improvement, United States Department of Education.

Jago, Carol. "Flotation Strategies for Sinking Students: Kids, Cops, and Communication," *English Journal,* v78 n2 p19-22 Feb 1989.

Presents a model for working with students at risk, helping them develop critical thinking, listening, reading, and writing skills.

Keating, Daniel. "Adolescents' Ability to Engage in Critical Thinking." National Center on Effective Secondary Schools, Madison, WI, 1988. 23p. [CS 009 423]

Presents several issues as central themes for the analysis of possible constraints on critical thinking among adolescents. First is the degree to which such thinking can more usefully be considered as a general ability, instead of necessarily being tied to specific domains of content knowledge. Second is whether the metaphor of

"skill" is in fact the most appropriate one. Third is whether it is helpful to regard the various aspects of thinking as relatively more independent (and perhaps hierarchical) or more interdependent, even unitary. A synthesis of research supports the belief that fundamental developmental limitations are not a significant source of performance limitations for adolescents. An evaluation of current research suggests that the source of the limitations is more likely to be found in our educational practices. For a truly open, critical discourse, the recognition that knowledge is "problematic and tentative" is essential. This viewpoint, however, runs counter to the socially appointed authoritarian role that is imposed on teachers. Thus, a host of factors conspire to limit discourse, and discourse seems essential to the development of critical thinking and reasoning. Two routes to meeting this challenge are to study teachers who are able to create an effective classroom climate for discourse, despite the constraints; and to examine more closely the organizational and systemic factors which reinforce the current framework.

Mader, Thomas F.; Mader, Diane C. "The Language of Critical Thinking: Logical Exercises and Legal Cases for Use in the Speech Communication Classroom." Paper presented at the 79th Annual Meeting of the Eastern Communication Association, 1988. 26p. [ED 293 166]

Addresses two recurrent concerns in educational debate—how a discipline can contribute to students' analytical and critical thinking, and how to improve students' ability to express themselves orally and in writing. The Language of Critical Thinking course is designed to strengthen critical thinking skills by using a legal case study approach. This method allows students to concentrate on the analysis of issues, on the development, evaluation, and organization of arguments, and on perfecting a clear and effective style.

Marzano, Robert J. "Policy Constraints to the Teaching of Thinking." Mid-Continent Regional Educational Lab, Inc., Aurora, CO, 1988. 12p. [CS 009 511]

Reflects the growing agreement on a national and local level that direct instruction in higher order thinking skills should be a major educational focus. To satisfy this growing awareness and perceived need, a number of programs have been developed. Given the widespread interest in teaching thinking and the increasing number of programs to satisfy that interest, it could be assumed that the incidence of direct instruction in thinking at the classroom level would be rapidly increasing. However, the implementation of thinking skills programs appears to be a slow process, with many hurdles to overcome. A curriculum which included the teaching of thinking would necessarily have a balance among factual content objectives, metacognitive objectives, and cognitive objectives. Those in positions of authority at the local, state, and national levels should mandate that assessment techniques should not be comprised primarily of objective, quantitative measures. Instead, more holistic and qualitative measures must be legitimized within education. Finally, distinctions as to the domain of responsibility of educators versus non-educators must be established and articulated at all policy levels.

Neilsen, Allan R. *Critical Thinking and Reading: Empowering Learners to Think and Act.* Monograph on Critical Thinking Number 2. Monographs on Teaching Critical Thinking Series. ERIC Clearinghouse on Reading and Communication Skills, Bloomington, IN; National Council of Teachers of English, Urbana, IL, 1989. 54p. [CS 009 640]

Argues that the present educational system can do little to foster critical thought because it is rooted in a world view that sees thinking and reading as isolated "skills" that can be transmitted to learners via a teacher-centered pedagogy. Suggests that educators consider a perspective from which reading and thinking are seen as critical attitudes or states-of-mind that help to shape one's daily life. Contends that this shift in perspective on thinking and reading must be accompanied by a shift to a more learner-centered pedagogy that provides students with opportunities and incentives to develop critical minds by engaging in projects that are of personal interest and consequence.

Norris, Stephen P. *Verbal Reports of Thinking and Multiple-Choice Critical Thinking Test Design.* Technical Report No. 447. Bolt, Beranek and Newman, Inc., Cambridge, MA; Center for the Study of Reading, Univeristy of Illinois, Urbana, IL, 1989. 28p. [CS 009 477]

Describes a methodology for using verbal reports of thinking to develop and validate multiple-choice tests of critical thinking. These verbal reports of individuals' thinking on draft items of multiple-choice critical thinking tests can be used systematically to provide evidence of the thinking processes elicited by such tests, and in

this case were used to develop and validate a test of observation appraisal.

Rosebery, Ann S.; and others. "The Problem-Solving Processes of Writers and Readers." Occasional Paper No. 7. Center for the Study of Writing, Berkeley, CA; Center for the Study of Writing, Pittsburgh, PA, 1989. 30p. [CS 211 679]

Argues that while young children's problem-solving models are not as elaborate as those of older students, they share an important belief, namely, that writing and reading are fundamentally purposeful acts of communication. Focusing on the interpretation of process, in particular on writing and reading as forms of problem solving that are shaped by communicative purpose, three sets of vignettes show students at different stages of schooling as they write and read. They illustrate the nature of problem solving in skilled reading and writing processes that are held as goals for college students; place these processes in context by considering some of the factors that influence students' problem solving as they write and read in response to typical class assignments; and explore the problem-solving skills that young students—children learning to write and read and adolescents expanding their writing and reading abilities—bring to their school assignments.

Roth, Rita; Adler, Susan. "Critical Inquiry in Teacher Preparation." Paper presented at the 69th Annual Meeting of the American Educational Research Association, 1985. 38p.
[ED 264 187]

Presents a case study of a recently reconceptualized teacher education program which has a critical inquiry base and an emphasis on "language across the curriculum." Describes the program's rationale, organization and practice, along with a description of the ongoing process of program development.

Siegel, Marjorie; Carey, Robert F. *Critical Thinking: A Semiotic Perspective.* Monograph on Critical Thinking Number 1. Monographs on Teaching Critical Thinking Series. ERIC Clearinghouse on Reading and Communication Skills, Bloomington, IN; National Council of Teachers of English, Urbana, IL, 1989. 55p. [CS 211 649]

Encourages teachers to consider the notion that thinking critically is a matter of reading signs, that it is the function of signs that makes reflective thinking possible. Contains the following chapters: (1) "Beyond a Literal Reading"; (2) "Current Thinking on Critical Thinking"; (3) "The Roots of a Semiotic Perspective: C. S. Peirce and Semiosis"; (4) "Critical Thinking in Semiotic Perspective: A Process of Inquiry"; (5) "The Practice of Critical Thinking"; and (6) "Classroom Contexts for Critical Thinking."

Smith, Carl B. "Prompting Critical Thinking (ERIC/RCS)," *Reading Teacher,* v42 n6 p424 Feb 1989.

Discusses how teachers can provide classroom experiences that lead young readers to react critically to what they read. Suggests ways to focus attention and target evaluative responses to literature.

Thomas, Ruth G., ed. *Higher Order Thinking: Definition, Meaning and Instructional Approaches.* Home Economics Education Association, Washington, DC, 1987. 79p. [ED 287 998; not available from EDRS]

Presents current thinking, research, and practice in the area of higher order thinking skills with home economics educators, including teachers, supervisors, and teacher educators.

Tierney, Robert J.; and others. "The Effects of Reading and Writing upon Thinking Critically," *Reading Research Quarterly,* v24 n2 p134-73 Spr 1989.

Examines whether writing in combination with reading prompts more critical thinking than either activity alone, or either activity combined with questions or with a knowledge activation activity. Finds that students who both wrote and read made more revisions (prompted by more critical thinking) than students in any other treatment group.

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Left Brain/Right Brain: Research and Learning

by Ruth Eppele

The Americal school system has often been described as a left-brain centered system, that is pertaining to the more scientific or logic based hemisphere of the brain. Research on brain orientation shows that a good portion of the population is right-brain dominant and learns, or struggles to learn, to conform to this left-brain orientation. Many articles and papers dealing with left-brain/right-brain theory and its affect on language learning have been appearing at conferences and in various trade journals over the past decade. There is some controversy over this issue as it challenges the structure and history of the American education system and many of the applications proposed would change the focus of the classroom from the group as a whole to the individual student and his/her individual brain orientation or learning style.

This bibliography represents the scope of most of the articles added to the ERIC database from 1983 through 1988 on left-brain/right-brain research, theory and application as it relates to classroom incorporation. This bibliography does include conflicting opinions as to the usefulness of left-brain/right-brain studies and their application in the learning environment. However, the majority of the articles in the database describe learning activities which incorporate the research and support application in the classroom. Many of the authors propose ways for people to become more "whole-brained".

An Overview

Segal, Bertha E. "Teaching English through Action: Total Physical Response (T.P.R.). A Right-Brain/Left-Brain Approach to Language Acquisition. A Workshop." Paper presented at the 21st Annual Meeting of the International Association of Teachers of English as a Foreign Language, 1987. 10 p. Adapted from a chapter in the author's *Teaching English through Action*, (1981); see ED 224 291. [ED 285 428]

Presents materials from a teacher workshop on the Total Physical Response method for teaching English as a second language. Describes the process of first language acquisition; uses physical activities in the classroom to reinforce learning; gives basic procedures for a listening lesson, a vocabulary unit, an initial lesson in basic commands, a lesson in body parts, a lesson in classroom objects, and a review lesson; and provides a chart to record student progress.

Stacks, Don W.; Andersen, Peter A. "Toward a Holistic Neurophysiological Understanding of Intrapersonal Communication." Paper presented at the 73rd Annual Meeting of the Speech Communication Association, 1987. 33 p. [ED 289 181]

Reviews how the brain operates at the most basic level of interest to human communication theorists, intrapersonal communication. Includes a table of brain functions and structures and a diagram of the triune brain.

Theory and Recent Literature

Haring, Ed. *Teaching and Learning Styles*. Illinois, 1985. 17 p. [ED 258 658]

Reviews recent literature on learning styles and teaching styles, and the relationship between the two. Presents a brief overview of brain research with respect to learning styles, followed by a series of suggestions for teachers to help them recognize different aspects of learners and make the instructional changes which allow students a better opportunity to learn and to be more responsible for their own learning.

Herrmann, Ned. "The Creative Brain," *NASSP-Bulletin*, v66 n455 p31-46 Sept 1982.

Outlines the differences between left-brain and right-brain functioning and between left-brain and right-brain dominant individuals, and concludes that creativity uses both halves of the brain. Discusses how both students and curriculum can become more "whole-brained."

Hines, Terence. "Left Brain, Right Brain: Who's on First?" *Training and Development Journal*, v39 n11 p32-34 Nov 1985.

States that none of the left-brain/right-brain "mythology" is supported by the actual research on the differences between the left and right human cerebral hemispheres.

Lord, Thomas R. "A Plea for Right Brain Usage," *Journal of College Science Teaching*, v14 n2 p100-2 Nov 1984.

Offers reasons why educators should emphasize right-brain understanding in educational curricula at all levels.

Recent Research

Reifschneider, Thomas J., ed.; and others. "The Human Brain: Cognition in Education." Report of the First Annual Conference, September 24-25, 1982. 94 p. [ED 234 035]

The papers in this monograph were presented at the first annual conference on theories and research related to learning styles, hemisphericity, and other cognitive-related issues in education. Includes Jack Kreitzer's "Poems Take Two Brains (or: Poetry Ain't for Halfwits)."

Millard, David E.; Nagle, Stephen J. "Minds, Brains, and the Language Arts: A Cautionary Note." Paper presented at the 37th Annual Meeting of the Conference on College Composition and Communication, 1986. 18 p. [ED 283 221]

Provides reasons for writing teachers to wait to use mind-brain research to revise pedagogical literature.

Coulson, Louis T.; Strickland, Alison G. "Your Brain Tells Plenty about Your Management Skills," *Executive Educator*, v5 n7 p22-23, 27 Jul 1983.

Comparison of the thinking styles of 21 corporate chief executive officers (CEO's) and 23 school superintendents from across the United States reveals CEO's as right-brain oriented (innovative, intuitive), and superintendents as left-brain oriented (logical, rational). Suggests both groups strive for "whole-brained thinking," balancing both orientations.

Mounts, Deborah S.; Street, Steven C. *Whole Brain Learning Summer School Project.* Migrant Child Education-Region II, California, 1983. 46 p. [ED 237 289]

Describes a summer school project for 200 migrant children (K-8) to determine whether significant change in teacher and student behaviors would result from combining right-brain and left-brain learning activities for 34 school days.

Robbins, Steven B. "Left-Right Brain Research and Its Premature Generalization to the Counseling Setting," *Journal of Counseling & Development*, v64 n4 p235-39 Dec 1985.

Brain lateralization research has led to speculation about counseling and guidance implications of left-right brain differences. Serious limitations in these implications are highlighted.

Keenan, Donna; Smith, Michael. "Sex Discrimination and Cerebral Bias: Implications for the Reading Curriculum," *Reading Improvement*, v20 n1 p50-53 Spr 1983.

Reviews research supporting the concept that girls usually outperform boys on tasks requiring verbal skills and that boys outperform girls on tasks using visual and spatial skills. Offers an explanation for this situation based on left-brain/right-brain research. Concludes that the curriculum in American schools is clearly left-brain biased.

Hauck, LaVerne S., Jr. "Differences in Information Mapping Strategies in Left and Right Brain Learners." Paper presented at the Annual Meeting of the American Vocational Association, 1985. 9 p. [ED 270 474]

Describes research on the Information Mapping technique which was used to present a learning packet; its usefulness in helping right-brain cerebrally dominant students to achieve the same level of subject mastery as their left-brain counterparts was examined.

Bohning, Gerry; Read, Donna. "Selected Symposium Summaries, 21st Annual Conference of the Florida Reading Association, 1983." *Florida Educational Research and Development Council Bulletin*, v17 n4 Spr 1984. 56 p. [ED 253 864]

Eight papers summarized in this collection were drawn from a 1983 conference symposium designed to expand and disseminate increased understanding about reading and its instruction. One paper focuses on what research says to the reading teacher about left brain/right brain modality preference.

Dombrower, Jule; and others. "The Criterion-Related Validity of Two Tests Hypothesized to Represent Left Brain and Right Brain Function for a Group of Elementary School Children," *Educational and Psychological Measurement*, v42 n3 p927-33 Fall 1982.

Investigates the concurrent and postdictive validity of two newly-devised tests of contrasting hemispheric function (Test of Right Hemisphere Ability, Test of Left Hemisphere Ability) relative to scores earned on the reading and mathematics portions of the Comprehensive Tests of Basic Skills.

Program and Curriculum Application

Thomas, Yvonne A.; Thomas, Stephen B. "Cerebral Lateralization and Its Effect on Drawing," *Education*, v104 n1 p47-50 Fall 1983.

Discusses the importance of both sides of the brain for the development of drawing skills but notes that the left brain can inhibit the action of the right brain. Provides a discussion of cerebral lateralization and child development. Suggests five drawing exercises to help develop hemispheric cooperation.

Badian, Nathlie A. "Nonverbal Disorders of Learning: The Reverse of Dyslexia?" *Annals of Dyslexia*, v36 p253-69 1986.

Teacher perceptions of the social-behavioral characteristics of 99 boys (aged 7-14) identified by their nonverbal learning abilities found that low nonverbal subjects showed good left-brain functioning, good reading, poor right-brain functioning, poor arithmetic skills, low motivation, poor work habits, disorganization, and poor relationship with peers.

Stein, Harry. "Visualized Notemaking: Left-Right Brain Theory Applied in the Classroom," *Social Studies*, v78 n4 p163-68 Jul-Aug 1987.

Encourages visual notetaking to help students improve learning. Emphasizes that when students use verbal and visual cues, the entire brain is called to action. Specific examples of notetaking such as "T-line," "Stickperson," and "Star models" are illustrated.

Blake, William E. "Science and Creative Writing: An Ad(d)verse Relationship?" *Science Teacher*, v50 n9 p30-33 Dec 1983.

Suggests integrating creative writing activities into field trips or outdoor education experiences in science as a method of providing "right-brain" and "left-brain" activities in the same exercise. Provides instructions given to students and a poem written from student "photographs" using imaginary cameras.

Yellin, David. "Left Brain, Right Brain, Super Brain: The Holistic Model," *Reading World*, v23 n1 p36-44 Oct 1983.

Argues that, despite nearly three decades of research into cognitive processes that has yielded a great deal of information about how humans learn, little of this research has found its way into classroom application. Suggests ways that a holistic approach to education can improve student cognitive performance.

Wess, Robert C. "Creativity and Composing: The Composition Teacher as Student," *Teaching English in the Two Year College*, v12 n3 p191-97 Oct 1985.

Proposes that teachers use their own writing as a teaching tool. Discusses both the left-brain logical, rational approach and the right-brain intuitive approach to invention and states that in composing their own methods and materials, instructors can stress both patterns of creativity by illustrating how each complements the other.

Steinley, Gary. "Left Brain/Right Brain: More of the Same?" *Language Arts*, v60 n4 p459-62 Apr 1983.

Suggests several activities designed to stimulate both the right and left sides of the brain when students are reading literary texts.

Lewallen, Martha. *An Annotated Bibliography of the Literature Dealing with the Incorporation of Right-Brain Learning into Left-Brain-Oriented Schools.* Exit Project, Indiana University at South Bend, Indiana, 1985. 52 p. [ED 258 722]

Articles and documents concerning brain growth and hemispheric specialization, theories of cognitive style, educational implications of brain research, and right-brain learning activities are cited in this annotated bibliography. Citations are preceded by a glossary of terms and followed by a brief review of the assembled literature. Thirteen classroom techniques for stimulating the right brain are listed and briefly described.

Struve, Nancy. *The Beautiful Brain: A Unit for Grades 5-9 with Further Explorations for Gifted and Talented.* Area Education Agency 7, Cedar Falls, IA., 1982. 62 p. [ED 244 430]

Provides information on the study of the human brain for students in grades 5-9, with suggestions for extending the lessons for gifted and talented students. This document is part of a collection of materials from the Iowa Area Education Agency 7 Teacher Center Project.

Huck, Sharon; Rosenblum, Eileen. "Innovations in ESL Curriculum Design: Kindergarten through Grade 12." Paper presented at the 4th Annual Conference of the Northern Regional Chapter of Illinois Teachers of English as a Second Language/Bilingual Education, 1982. 30 p. [ED 232 466]

A proposed approach to English as a second language (ESL) curriculum design for kindergarten through grade 12 is based on Bloom's taxonomy and McCarthy's four learning styles for right/left-brain learning.

Stahl-Gemake, Josephine; And Others. "The Right Brain: An Active Partner in Written Literacy." Paper presented at the 4th Annual Meeting of the Eastern Regional Conference of the International Reading Association, 1982. 17 p. [ED 228 610]

Describes a graphic configuration called a "web," a visual-spatial network with nodes and emanating lines representing the connections among ideas in our mind, which has been developed to provide reading and writing activities that integrate the processing power of both hemispheres. Webs have been used to help students visualize how new information fits into their existing cognitive framework, to promote prediction of story events, to serve as advanced organizers for disabled readers, and to provide a means to build vocabulary.

Rubin, Janet E. "Back to Basics through Creative Dramatics." (1978) 9 p. [ED 219 769]

Argues for the continued use of creative dramatics in the English classroom because it helps to develop the entire child. The effects of creative dramatics on both left- and right-brain learning proves that it is a sound educational technique.

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(812) 855-5847

WOULD YOU LIKE EASY ACCESS TO EDUCATIONAL INFORMATION?

If you are involved in graduate studies, developing and evaluating programs or curricula, designing a new course or revamping an old one, writing a report, or any of countless other projects in the areas of reading, English, journalism, speech, or drama, then you already know how important it is to locate and use the most relevant and current resources. And if you have not been using ERIC, you have been missing a lot, simply because *many resources in the ERIC database are not available anywhere else.*

These resources cover all areas of education, including research reports, case studies, bibliographies, surveys, government reports, curriculum guides, teaching guides, program descriptions and evaluations, instructional materials, course descriptions, speeches, and conference reports.

Currently about 700,000 document abstracts and journal article annotations make up the ERIC database, which grows at the rate of approximately 30,000 entries per year. In order to make these resources more accessible to you, the ERIC Clearinghouse on Reading and Communication Skills offers a computerized database search service.

WHAT IS THE DIFFERENCE BETWEEN A COMPUTER SEARCH AND A MANUAL SEARCH?

The computer is much faster and far more efficient. Some highly complex searches that a computer can do in minutes would be virtually impossible for a person to do using the ERIC indexes *Resources in Education* and *Current Index to Journals in Education*. The computer offers the opportunity to search under several index terms at the same time

HOW DOES A COMPUTER SEARCH WORK?

ERIC uses a coordinate indexing system, with each document indexed under as many as 12 index terms, or "descriptors." These descriptors identify the educational level and content areas of a document. A computer search involves combining the descriptors for the specific search question into a search statement, which is then entered into the computer. Those documents that meet the requirements of the search statement are retrieved.

WHAT DO I GET?

You receive a printout of ERIC references that include complete bibliographic citations, annotations of journal articles, and 150- to 250-word abstracts of documents on your topic.

WHAT DOES IT COST?

The minimum charge for a customized computer search is $30 for up to 50 journal citations and/or document abstracts, plus $.10 for each additional reference. This fee includes handling and mailing. You will be billed for the cost upon completion of the search.

HOW LONG DOES IT TAKE?

Generally, the time from our receipt of your request to your receipt of the printout is two weeks.

WHAT DO I HAVE TO DO?

No prior knowledge of computers or computer searching is necessary. A member of our staff can help you define your search question. Our knowledge of the ERIC database, especially in the areas of reading and the other English language arts, can be an important aid in developing a successful search.

If you would like our clearinghouse to run a computer search on a topic of your choice, fill out and return the attached order form. If your question needs further clarification, a member of our staff will call you before conducting the search.

COMPUTER SEARCH SERVICE ORDER FORM

Name _____

Position _____

Organization _____

Street _____

City _____ State _____

Zip _____ Phone _____

Purpose of search:

Education level _____

Format (circle one):

Research reports	Journal citations only
Practical applications	Document abstracts only
Both	Both

Known authority in field (if any) _____

Possible key words or phrases:

Restrictions: Year(s) _____

Monetary _____

Statement of search question:

ERIC/RCS

ERIC in Print

Clearinghouse on Reading and Communication Skills
Indiana University
Smith Research Center, Suite 150
Bloomington, IN 47408-2698
(812) 855-5847

Searching ERIC in Print

ERIC (the Educational Resources Information Center) is an information resource designed to make educational literature easily accessible through two monthly bibliographic publications: *Resources in Education (RIE)* and *Current Index to Journals in Education (CIJE)*. By following the steps below, individuals can quickly locate literature for their specific educational information needs.

1. **Phrase Your Question as Precisely as Possible.** Then list the key concepts of that question in as few words or phrases as possible.
2. **See If Your Indexing Terms are Listed in the** *Thesaurus of ERIC Descriptors*. If they are listed, look for other descriptors that come close to matching your terms. To help you in this procedure most descriptors are listed with a display of cross-references to other descriptors, including narrower terms (NT); broader terms (BT); and related terms (RT) within the same area of classification.
3. **Go to the Subject Index Sections of the Monthly, Seminannual, or Annual Issues of *RIE*.** Read the titles listed under the descriptors you have chosen and note the six-digit ED (ERIC Document) numbers for those documents that seem appropriate for your information needs.
4. **Locate and Read the Abstracts of These Documents in the Main Entry Sections of the Monthly *RIEs*.** Main entries are listed consecutively by ED number.
5. **To Find the Complete Text of the Document, First Examine the Abstract to See if It Has an EDRS Price.** If it does, the document is available both in ERIC microfiche collections (which are owned by over 700 libraries nationwide) and through the ERIC Document Reproduction Service (EDRS) in Virginia. EDRS ordering information is given in the back of every RIE. If the document is not available through EDRS, it is due to copyright restrictions placed on the document by its author or publisher. In these cases, ordering information will be given in the document abstract in a note labeled "available from."
6. **If You Have Trouble With Your Search** (e.g., the documents are not exactly what you want or you find no documents), return to steps one and two, checking your search terms. You also may want to ask your librarian for assistance in identifying descriptors.

If you want to expand your search to include journal articles, use *CIJE* in addition to *RIE*. Remember, however, that copies of journal articles are not available from EDRS. If you want to read the complete article, you must obtain the journal from a local library, the publisher, or University Microfilms International.

A. A kindergarten teacher has been asked by some of his neighbors who have preschoolers if there is anything they can do at home to help their children get ready for writing in school. The teacher decides that the key concept involved is Writing Readiness.

B. The teacher checks that term in the *ERIC Thesaurus* at a nearby university library and finds it listed.

C. Selecting one of the library's volumes of *RIE*, in this case the January-June 1988 semiannual index, *the teacher finds the following documents in the subject index:*

Writing Readiness

Children's Names: Landmarks for Literacy?
ED 290 171
Integrating Reading and Writing Instruction at the Primary level. **ED 286 158**
Sister and Brother Writing Interplay.
ED 285 176
Writing Begins at Home: Preparing Children for Writing before They Go to School.
ED 285 207

D. **ED 285 207** Looks like an appropriate resource, so the teacher finds that ED number in a monthly issue of *RIE "January 1988" in the document resume section:*

ED 285 207 **CS 210 790**

Clay, Marie
Writing Begins at Home: Preparing Children for Writing before They Go to School.
Report No. ISBN-0-435-08452-6
Pub Date 87
Note 64p.
Available from Heinemann Educational Books Inc., 70 Court St., Portsmouth, NH 03801 ($12.50)
Pub type Books (010) - Guides - Non-Classroom (055)

Document Not Available from EDRS.
Descriptors_Case Studies, Family Environment, Language Acquisition, *Parent Child Relationship, Parent Participation, Parent Role, *Preschool Children, Preschool Education, Psychomotor Skills, Reading Writing Relationship, Writing Exercises, *Writing Readiness, *Written Language
Identifiers_*Childrens Writing, *Emergent Literacy, Writing Attitudes

Intended for parents of preschoolers, this book offers samples of children's writing (defined as the funny signs and symbols that pencils make) and attempts to show how parents can support and expand children's discovery of printed language before children begin school. Each of the eight chapters contains numerous examples of young children's drawing and printing, as well as helpful comments and practical considerations to orient parents. The chapters are entitled: (1) Getting in Touch; (2) Exploration and Discoveries; (3) I Want to Record a Message; (4) We Follow Sally Ann's Progress; (5) Individual Differences at School Entry; (6) How Can a Parent Help?; (7) The Child at School; and (8) Let Your Child Read. (References and a list of complementary publications are attached.) (NKA)

E. The teacher notes the price and ordering information for his neighbors. The teacher can then select other *RIE* documents to review from other volumes of the *RIE* index, or check *CIJE* for journal articles on writing readiness.

KEYS TO USING ERIC

Thesaurus of ERIC Descriptors

The *ERIC Thesaurus* is the key to a search of the ERIC database, with approximately 10,000 terms and cross-references in the fields of education. Scope notes serve as definitions for most descriptors. Each document in the ERIC system is assigned several descriptors from the *Thesaurus* that indicate the essential content of the document. Once you have familiarized yourself with ERIC's descriptors and the *Thesaurus*, you have put thousands of pages of educational materials at your fingertips.

Resources in Education (RIE)

This publication prints the abstracts of documents processed and indexed for the ERIC system. About 1000 abstracts from ERIC Clearinghouses appear each month, arranged by ED number in the main entry section of *RIE*. In addition to the main entry section, each volume of *RIE* contains three indexes. Document titles are listed by subject (descriptor term), author, and institution. Unless otherwise noted, copies of documents abstracted in *RIE* are available from the ERIC Document Reproduction Service.

Current Index to Journals in Education (CIJE)

This ERIC publication directs you to educational articles from over 800 educational journals. Annotations describing over 1400 articles each month are arranged in the main entry section of *CIJE* according to EJ (ERIC Journal) number and are listed in subject, author, and journal indexes. Copies of journal articles annotated in *CIJE* are not available from the ERIC Document Reproduction Service but may be obtained from local library collections, from the publisher, or (in most cases) from University Microfilms International.

Semiannual and annual issues of *RIE* and *CIJE* consolidate the monthly subject, author, and institution indexes.

COMPUTER SEARCHES

Over 900 organizations across the nation, including the individual ERIC Clearinghouses, provide computerized searches of the ERIC database. The search strategy—selecting the key descriptors and scanning the documents under those subject headings—is the same as for manual searching. The differences are in time and cost. When you search by computer, you can combine several terms instantaneously for any or all issues of *RIE/CIJE*; in effect, you thumb through more than 200 issues of *RIE* at once. Costs for these services vary; while some institutions offer computer searches at no cost to in-state educators, others may charge from $5 to $300, depending upon the complexity and depth of the search or the kind of feedback requested. Our Clearinghouse can assist you in developing computer search strategy, and can provide information about computer search facilities near you. No prior knowledge of computers or computer searching is necessary.

CUSTOMIZED SEARCHES AVAILABLE

Customized computer searches of the ERIC database will be performed for you by the ERIC/RCS Clearinghouse, if you wish. The charge for this service is $30 for the first 50 citations. If your search problem does not fall within the scope of ERIC/RCS, we will refer your question to one of the other Clearinghouses in the ERIC System, or help you contact the appropriate Clearinghouse directly.

ERIC/RCS

Submitting Material

Clearinghouse on Reading and Communication Skills
Indiana University
Smith Research Center, Suite 150
Bloomington, IN 47408-2698
(812) 855-5847

WHY NOT SEND YOUR MATERIAL TO ERIC/RCS?

The ERIC system is always looking for high-quality educational documents to announce in *Resources in Education (RIE)*, ERIC's monthly index of document abstracts. ERIC, Educational Resources Information Center, sponsored by the Office of Educational Research and Improvement of the U.S. Department of Education, is a national educational information system designed to make available hard-to-find educational materials (such as research reports, literature reviews, conference papers, curriculum guides, and other resource information). Through a network of clearinghouses, each of which focuses on a specific field in education, materials are acquired, evaluated, cataloged, indexed, abstracted, and announced in *RIE*.

The Clearinghouse on Reading and Communication Skills is responsible for educational materials and information related to research, instruction, and personnel preparation in such areas as English language arts, reading, composition, literature, journalism, speech communication, theater and drama, and the mass media.

ERIC relieves you of the need to maintain copies of your materials for distribution to people or organizations requesting them, since documents can be ordered individually in both microfiche and paper copy formats from the ERIC Document Reproduction Service (EDRS) in Springfield, Virginia.

Dissemination through ERIC provides a wide audience for your materials since there are more than 700 ERIC microfiche collections throughout the world. In addition, your material can be retrieved at the more than 450 locations that provide computer searches of the ERIC database.

Because your documents are permanently indexed in *RIE* and on computer tape, ERIC serves an archival function as well as keeping users informed of current theories and practices.

We depend on our network of volunteer contributors to accomplish our goal of making information readily available to the educational community and to the general public.

HOW TO SUBMIT YOUR MATERIAL

Please follow the guidelines listed below for preparation of documents. Send two clean, dark-print copies, at least six pages in length, either in original or photocopied form to **Coordinator of Documents, ERIC/RCS, 2805 East Tenth Street, Smith Research Center, Suite 150, Bloomington, Indiana 47408-2698.**

Document Preparation. The following guidelines are designed to ensure that documents will be legible on microfiche and that readable copies will be available to ERIC users:

- Standard 8 1/2" x 11" white or light-tinted paper is preferred.
- Double-spaced pages printed on a laser printer or typed on a standard typewriter (pica or elite) photograph best. Dark-print dot-matrix computer printouts are acceptable.
- Letters and line drawings must be unbroken and as black as possible. Very small or finely drawn letters, as well as photographs and edited copy, will not reproduce well.
- Purple dittos and most colored pages will not photograph clearly.

WHAT HAPPENS NEXT...

To ensure its usefulness to the educational community, each document submitted is evaluated for quality and significance by one of approximately 200 specialists from various universities and the following professional organizations:

International Reading Association; Western College Reading Association; College Reading Association; National Reading Conference; North Central Reading Association; National Council of Teachers of English; Conference on College Composition and

Communication; Association for Education in Journalism and Mass Communication; Journalism Education Association; and Speech Communication Association.

If your document is approved by the reviewers, it will be indexed and an abstract of it will appear in *RIE* in approximately three to four months. At the time of issue you will be sent a complimentary microfiche of your material.

If you would like to know the disposition of your document please include a stamped, self-addressed envelope.

The inclusion of your document in the ERIC database in no way affects your copyright or your right to submit it for publication elsewhere. Your document will not be edited but will appear in its entirety.

Books on CRITICAL THINKING from ERIC/RCS

...for use in the classroom

Critical Thinking, Reading, and Writing,
by Mary Morgan and Michael Shermis (T03; $12.95)

Lesson plans for classroom use by teachers that encourage critically reflective, inventive thinking. These tried and tested lessons have been selected from among the thousands reported in the ERIC database and redesigned for maximum effectiveness. Lessons applicable at both the elementary and secondary levels involve students in role playing, information analysis, problem solving, journal writing, Whole Language analysis of literature, categorization and analogy, and much more.

...for use in your study

Critical Thinking: A Semiotic Perspective,
by Marjorie Siegel and Robert F. Carey (G01; $6.95)

Critical Thinking and Reading: Empowering Learners to Think and Act,
by Allan R. Neilsen (G02; $6.95)

Critical Thinking and Writing: Reclaiming the Essay,
by Thomas Newkirk (G03; $6.95)

This is a Critical Thinking series that roots and grounds the language-arts educator solidly in an intellectual tradition that upholds schoolteaching as an endeavor to hone growing minds to a keen edge. Siegel and Carey draw on the thought of C.S. Peirce; Neilsen draws on the thought of John Dewey; Newkirk draws on the thought of Michel de Montaigne—all of them stimulate a higher order of thinking and teaching, reading and writing, critical reflection and language mastery. Series editor, Jerome C. Harste; copublished with NCTE.

...for use in your mind

A Commitment to Critical Thinking,
by Carl B. Smith (G24; $9.95)

"Critical Thinking" is a good idea and a bit of a buzz word. How do we get beyond talking about it to actually getting our students to do it? Carl Smith, Director of ERIC/RCS, enables schoolteachers to see through the theories, and actually to "engage their students in the daily exercise of critical reading." A section on "the art of questioning" shows you how to be a Socrates in your classroom. Smith explores Critical Thinking as a social process, documents the changing philosophies that underlie the enterprise, and supplies many pages of amusing, practical, and provocative activities that work in the classroom. The 30-page annotated bibliography on Critical Thinking is the best on the subject.

Order Form

ship to:

name _____

address _____

_____

city/state/zip _____ phone ( ) _____

Item No.	Qty.	Abbreviated Title	Price	Total Cost
G01		*Critical Thinking: A Semiotic Perspective*	$6.95	
G02		*Critical Thinking and Reading: Empowering Learners to Think and Act*	$6.95	
G03		*Critical Thinking and Writing: Reclaiming the Essay*	$6.95	
G24		*A Commitment to Critical Thinking*	$9.95	
T03		*Critical Thinking, Reading, and Writing*	$12.95	
			Subtotal	
Minimum order $5.00			Plus Postage and Handling	
			TOTAL Purchase	

method of payment:

❑ check ❑ money order

❑ P. O. # _____

❑ MasterCard ❑ VISA

cardholder _____

card no. _____

expiration date _____

Make checks payable to ERIC/RCS.

Order Subtotal	Postage and Handling
$5.00-$10.00	$2.00
$10.01-$25.00	$3.00
$25.01-$50.00	$4.00
$50.01-$75.00	$5.00
$75.01-$100.00	$6.00
$100.01-$125.00	$7.00
$125.01-$150.00	$8.00
over $150.00	$9.00

Send order form to:
ERIC/RCS
Indiana University
2805 E. 10th Street, Suite 150
Bloomington, IN 47408-2698
Phone: (812) 855-5847
Fax: (812) 855-7901